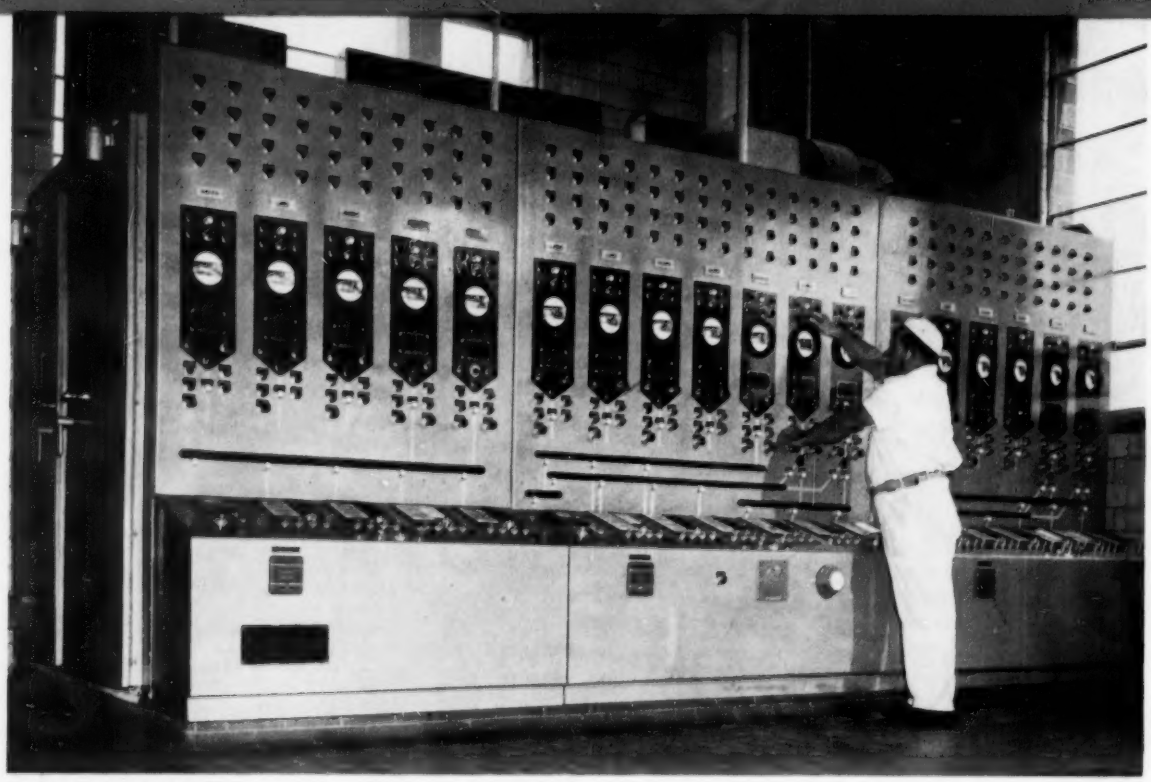
DECEMBER, 1956

A McGRAW-HILL PUBLICATION

PRICE 35 CENTS

# FOOD ENGINEERING

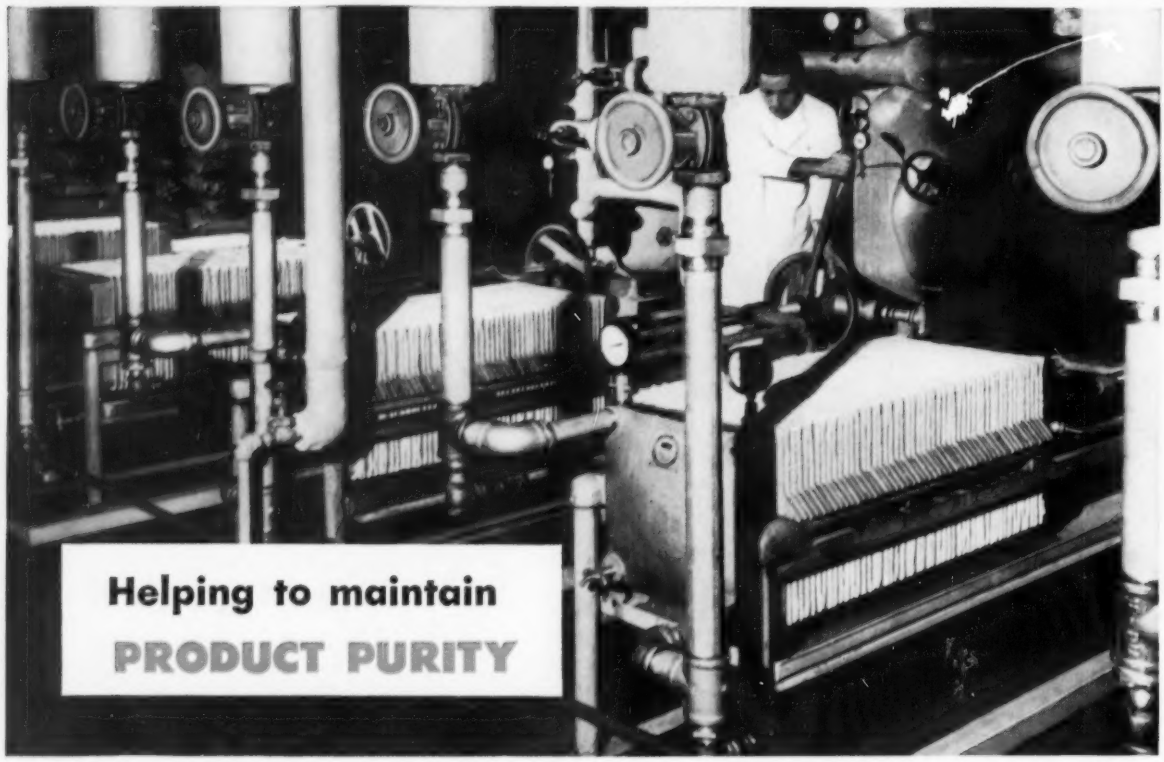


**INSTRUMENTS** • In new automated plant, push of buttons sends precise formulations to mixers. p. 58

**TRANSPORTATION** • Cost-cutting van body will ride on either trucks or rails. p. 98

ALSO: QUALITY CONTROL • SANITATION • PRODUCTS ENGINEERING • MAINTENANCE • MATERIALS HANDLING PROCESSING • PACKAGING • INGREDIENTS • PERSONNEL

INQUIRY COUPON INSIDE BACK COVER




Pre-filtered water at Hoffman Beverage Company being pumped through bank of filters. Grinnell-Saunders Diaphragm Valves shown are stainless steel.

# GRINNELL-SAUNDERS DIAPHRAGM VALVES

For help in preserving product purity, Hoffman Beverage Company (above) turned to Grinnell-Saunders Diaphragm Valves. Working parts of the valve are completely isolated at all times from the fluid in the stream. There's no disc holder in the stream; no chance of valve lubricant contaminating the product. Furthermore, the diaphragm lifts high for unobstructed flow in either direction with no pockets to trap fluid. Resilient diaphragm and large area of contact on the valve weir assures leak-proof closure.

Of course, simple maintenance is important, too. The only part of the valve that normally needs replacing is the long-wearing diaphragm, which can be inserted quickly, without removing the valve from the line.

Grinnell offers its diaphragm valve in a wide range of body and bonnet styles and also body, lining, and diaphragm materials. For the beer industry, for example, Grinnell has an *all-bronze* valve with fully-rounded opening, which permits ball-brush cleaning through the valve.

If you have a valve problem, it will certainly be worth your while to consult a Grinnell engineer.

### Choice of materials

**Bodies**
Iron; cast steel; stainless steel; Durimet 20; Hastelloy A, B, C; bronze; Monel; aluminum; PVC (polyvinyl chloride); Saran

**Body Linings**
Hard rubber; soft rubber; neoprene; glass; lead; plastics; Heresite; Lithcote

**Diaphragms**
Soft natural rubber; natural rubber; white synthetic rubber; neoprene; reinforced neoprene; butyl; Hycar; Teflon; Kel-F; PVC (polyvinyl chloride); polyethylene

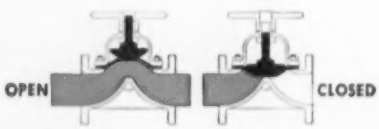
**Bonnets**
Iron; stainless steel; bronze; other materials on special order

### Valve types

**Straight Bodies**
Screwed; flanged; socket weld; butt weld; socket (solder); sanitary threads; hose ends; Victaulic

**Angle Bodies**
Screwed; flanged; socket weld

**Bonnets**
Handwheel (non-indicating stem, indicating stem); chain wheel; lever (for quick operation); sliding stem (for a wide selection of power operated topworks).

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**Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors**

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
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industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems



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**DECEMBER 1956**

*Volume 28 Number 12*

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# FOOD ENGINEERING

**16-Page Annual Index to FE Articles, Items, and Authors**...Opp. p. 210

FEATURE ARTICLES

Here's Sharp Closeup of the Food Additive Scrimmage..... 51
How Newly OK'd Antibiotic Boosts Poultry Shelf-Life..... 53
Experts See 4-Way Future for Antibiotic Agents..... 56
Line-Productivity "Precisioned"..... 57
"Tomorrow's Plant Today"—It Sets Engineering Pattern..... 58
50 Advanced Units Eyed by Industry Processors..... 62
Task Analysis Is Your Key to Lower-Cost Sanitation..... 70
Fruit Too Ripe to Ship Utilized in New Tasty Topping..... 73
3-Point Progress on Canning Line..... 74
What to Check When Selecting a Molded Plastic..... 76
"Air Lubricated" Bulk Goods Move More Efficiently..... 78
Practical 4-Step Approach for Getting Special Machines..... 84
Latest Units: Packing, Cleaning, Processing, Refrigerating..... 86
Boosts Distribution Efficiency..... 92
Quickly Tells Aeration Efficiency..... 95
Packaging Advance Saves $12,000 a Year..... 96
Transferable Van-Bodies Permit 3-Way Deliveries..... 98
Poultry Bagging Sped by Air-Squeeze Unit..... 101
Ole Sage: What Are Key Steps Before Workers Vote on Union?.... 102
Plant Design Masters Variable Input (Foldout Flowsheet)..... 108

INDUSTRY BRANCHES
To Which Articles Apply

| Baking | Beverages | Cereals | Confectionery | Dairy | Fruits, Vegetables | Meats, Fish | Other Foods |
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| • | • | • | • | • | • | • | • |
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| • | • | • | • | • | • | • | • |
| | | | | | | • | |
| • | • | • | • | • | • | • | • |

DEPARTMENTS

Practical Ideas ..... 5
FE Opinion ..... 106
New Equipment & Supplies 115
Letters to the Editor..... 134
New Packages & Products 138
Advances in Technology.. 151
Questions & Answers.... 163
Useful New Books..... 169
Keeping Up With Field... 171
Hors d'Oeuvres ..... 173
Schedule of Events..... 179
Recent Inventions ..... 183
Men & Companies..... 191
Just Off the Press..... 195
Advertisers' Index ..... 208
Readers' Service....back page

## CONTENTS CLASSIFIED BY SUBJECTS

SANITATION: New Antibiotic, 53; Future of Antibiotics, 56; 50 Advanced Units, 62; Lower-Cost Sanitation, 70; also 58, 74, 86, 101, 108, 121, 153-4.

PLANT ENGINEERING: Tomorrow's Plant, 58; 50 Advanced Units, 62; Getting Special Machines, 84; $12,000 Packaging Saving, 96; also 5-13, 57, 74, 78, 86, 101, 108. 115-21, 126, 130, 151, 186, 195.

MATERIALS HANDLING: Tomorrow's Plant, 58; 3-Point Canning Progress, 74; Pneumatic Handling, 78; Distribution Efficiency, 92; Transferable Van Bodies, 98; also 62, 96, 108, 116-7, 196.

PROCESSING: Tomorrow's Plant, 58; New Topping, 73; Packing, Cleaning, Processing Units, 86; Masters Variable Input, 108; also 51, 53, 56, 62, 95, 151-2, 156, 162-4, 169, 187, 199.

PACKAGING: 50 Advanced Units, 62; Selecting Molded Plastic, 76; Packing, Cleaning, Processing Units, 86; $12,000 Packaging Saving, 96; Poultry Bagging Sped, 101; also 58, 129, 138, 140, 163, 183, 196.

PERSONNEL: Food Additive Scrimmage, 51; Ole Sage: Union Question, 102.

QUALITY CONTROL: New Antibiotic, 53; Future of Antibiotics, 56; Tells Aeration Efficiency, 95; also 13, 57, 58, 62, 74, 101, 119-22, 153-4, 164, 167, 169, 200.

PRODUCTS: New Antibiotic, 53; New Topping, 73; also 58, 151, 157, 171-2, 178, 183.

INGREDIENTS: Food Additive Scrimmage, 51; New Topping, 73; also 58, 78, 129, 151.

INSTRUMENTS: Line Productivity, 57; Tomorrow's Plant, 58; also 13, 62, 95, 119, 130, 199.

MAINTENANCE: Line Productivity, 57; also 7-11, 74, 115-17, 125-6, 164-66, 196.

TRANSPORTATION: 3-Point Canning Progress, 74; Distribution Efficiency, 92; Transferable Van Bodies, 98; also 78, 130.

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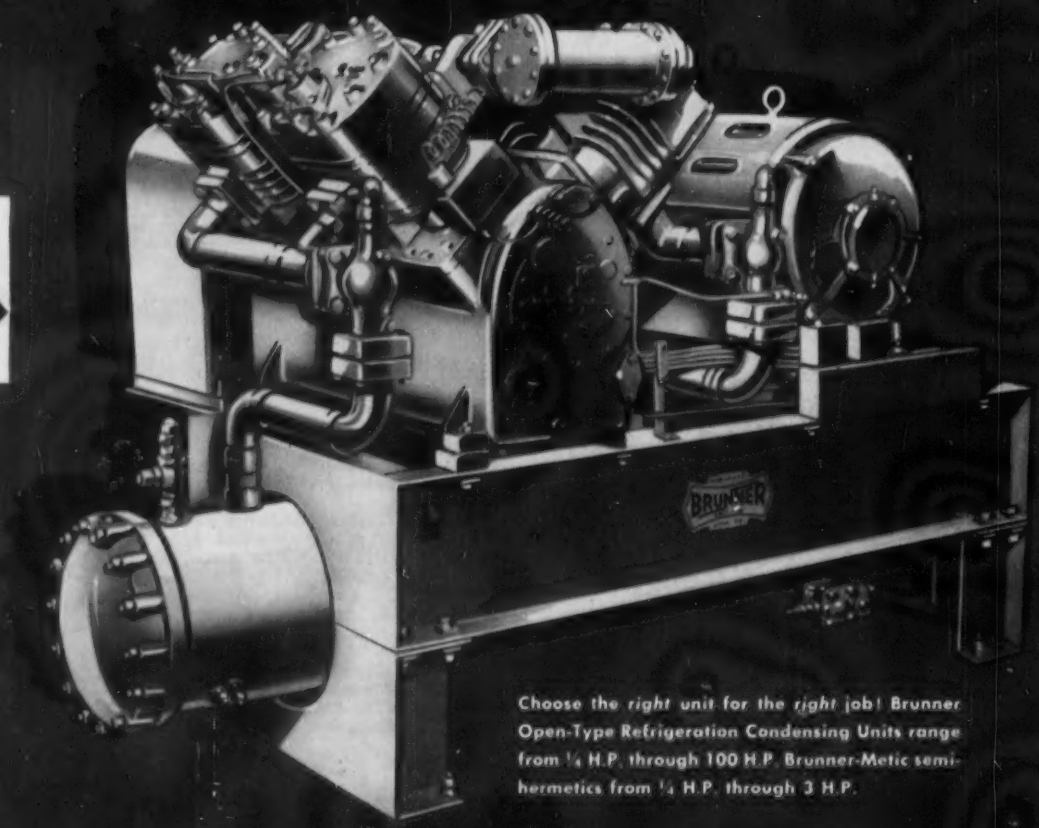
# 1906

Refrigeration had reached new heights of convenience and efficiency by 1906, thanks to engineering . . . and the iceman's muscles. The first Brunner-engineered product appeared in 1906.

# TODAY

## Brunner Engineering serves the food processing industry with Refrigeration Condensing Units for every requirement.

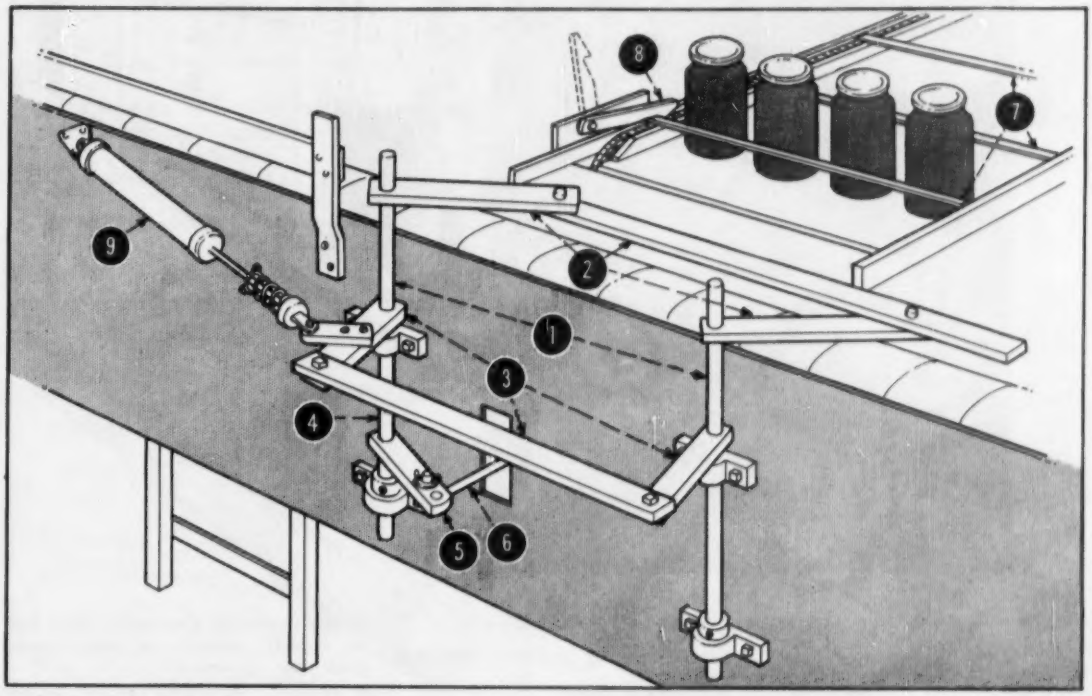
PROVEN QUALITY
50th Anniversary
BRUNNER
DEPENDABLE




Choose the *right* unit for the *right* job! Brunner Open-Type Refrigeration Condensing Units range from ¼ H.P. through 100 H.P. Brunner-Metic semi-hermetics from ¼ H.P. through 3 H.P.

CUT OUT AND FILE

# PRACTICAL IDEAS




## Synchronized Conveyor Transfer

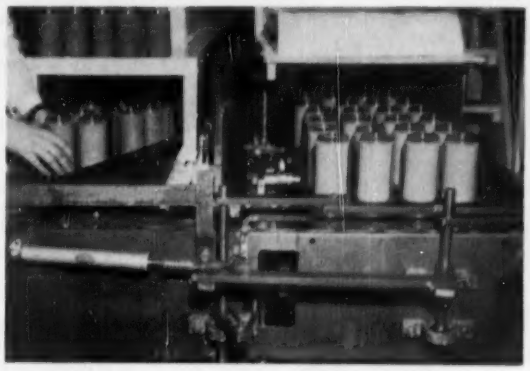
Here's a relatively simple arrangement for the automatic right-angle transfer of containers from single file to column formation.

We employ this type mechanism for shifting just-filled jars of peanut butter from an inline conveyor onto a slide conveyor feeding to the cooling tunnel (see photo).

Two shafts—(1) in sketch—were mounted vertically in ball-bearing hangers attached to the side of the single-file conveyor. Two bars and cross members (2) were then added to serve as a plow for effecting transfer of jars from one conveyor to other.

For rigidity and precision of action, shafts are further synchronized by a similar pair of bars and cross members (3) extending from vertical shaft at a lower level and from plow on opposite side.

Plow drive shaft (4) is attached through a lever (5) to a pull rod (6), which is operated by ratchet and pawl. Cross members (7), on chain-bar slide-conveyor running at right angles, provide the ratchet. The pawl is a pivoted notched arm (8) attached through slide mechanism to operate pull rod (6).



As each cross member (7) of conveyor advances,

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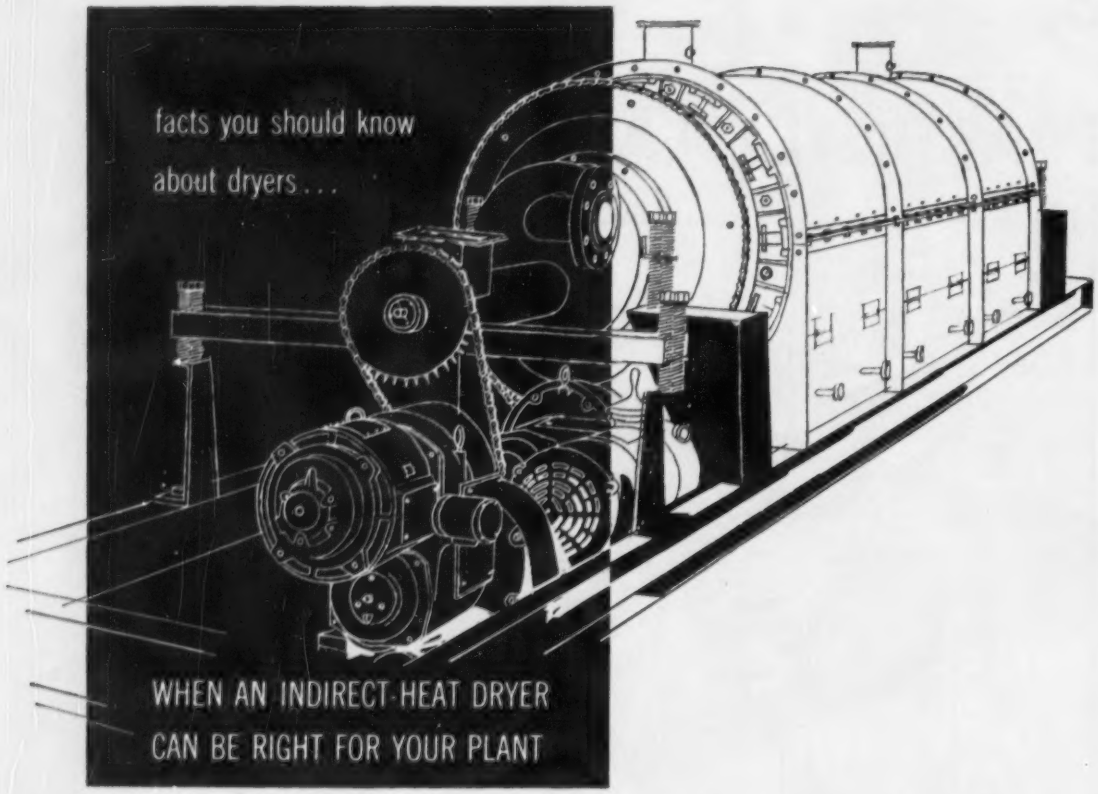


For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The records of this experience can often be applied to specific cases, possibly yours. For example . . .

**Q.** *My material is a filter cake, practically all minus 325 mesh, and must not contact furnace gases. It can be heated to 500° F. at least, without injury. What type of dryer would do the job best?*

**A.** You might consider using a direct-heat rotary dryer that utilizes clean, heated air as the drying medium—air heated by steam coils or a gas or oil fired heat exchanger. However, this introduces a considerable dust collection problem. Besides, from a standpoint of capacity, it is inefficient as well as from a heat-cost standpoint. This makes it unduly expensive. Therefore, a type of indirect-heat rotary dryer is indicated which would greatly reduce both the dust problem and the heat cost.

**Q.** *What is meant by an indirect-heat rotary dryer?*

**A.** One in which the material to be dried is warmed by contact with the heated metal surfaces, which in turn are heated by the medium used (usually furnace gases or steam). Those using furnace gases are called "indirect fire dryers". Atmospheric and vacuum drum dryers are examples of steam-heated indirect dryers, but the type in greatest use is the steam tube dryer. This is often referred to as the "Louisville Type" because of the thousands of Louisville Steam Tube Dryers built during the past 55 years.

**Q.** *How does an indirect-heat dryer minimize the dust problem?*

**A.** In an indirect-heat dryer, only enough air is admitted to carry off the evaporated moisture. Thus, the air has nothing to do with the heating of the material. Generally, this low air velocity results in insignificant dust loss.

**Q.** *How does this differ from the operation of a direct-heat dryer?*

**A.** In direct-heat dryers, the hot air furnishes the heat for drying besides removing the evaporated moisture. The amount needed to supply the necessary heat results in a sufficiently high velocity through the dryer to carry out an excessive amount of fine material particles.

**Q.** *It seems I need an indirect-heat dryer. How can I get competent advice and more information regarding my particular requirements?*

**A.** The Louisville Dryer engineering staff will be glad to analyze your requirements, arrange for necessary pilot plant tests, and submit an unbiased recommendation accompanied by estimated costs. You incur no obligation by using this service.

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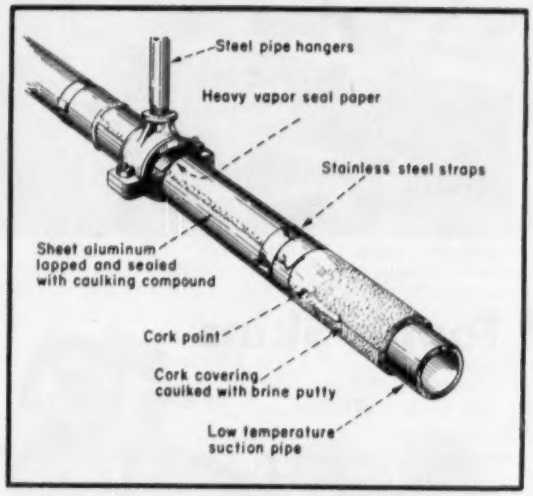
it engages in notched pawl, which moves forward, pulling rod (6) against tension provided by household door closer (9). When vertical shafts are rotated, they operate plow to effect transfer.

At end of its travel, pawl is lifted by a cam (which angles up from the horizontal to disengage pawl and crossbar).

Entire mechanism is then immediately snapped to starting position by tension in door-closing mechanism (9).

This unit has paid its cost many times in saved labor.—*C. D. Fulton, Plant Engineer, Old Dutch Foods, Inc., Blasdell, N. Y.*


Steel pipe hangers
Heavy vapor seal paper
Stainless steel straps
Sheet aluminum lapped and sealed with caulking compound
Cork paint
Cork covering caulked with brine putty
Low temperature suction pipe

## Protecting Pipe Insulation

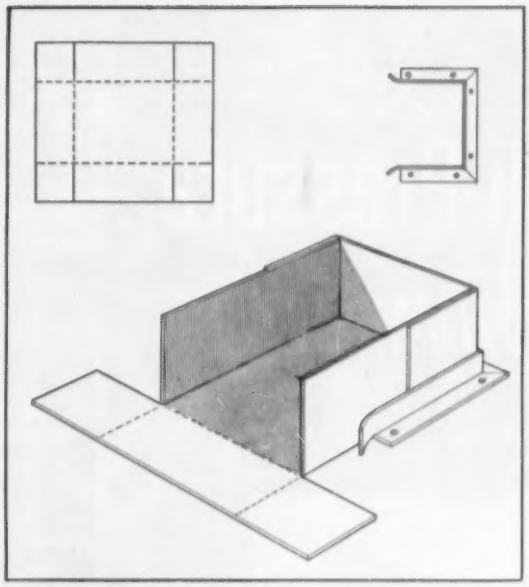
We found it necessary to span a distance of some 400 ft. with a low-temperature refrigerant suction line. The pipe was to cross above a railroad track and yard area and continue along the side of a building—entirely outside, exposed to all weather conditions.

Problem was to protect the cork-type insulation and covering from the elements.

The cork insulation (sketch) was applied in the usual manner, and all cracks or joints were carefully caulked with brine putty. The pipe covering was then given a coat of cork paint, after which the line was covered with aluminum sheeting, all sections of which were lapped and sealed with caulking compound. Finally, stainless steel straps were employed to hold the aluminum coverings in place.

The entire pipeline was supported by steel hangers. However, before the pipe was placed in the hangers, latter were lined with heavy vapor-seal paper so that the steel would not contact the aluminum.

Now, after seven years service, there has been no deterioration of the pipeline—no sign of electrolysis between aluminum and stainless steel strap or between aluminum and steel hangers. Furthermore, no maintenance of any kind has been needed.—*P. J. Morrissey, Security Warehouse & Cold Storage Co., San Jose, Calif.*



## Metal Form for Boxing Cheese

We have found it nearly impossible for a single man to box chees in solid fiber Cornell containers. Trying to hold sides and ears and then position the sleeve on top has proved too difficult.

Now, however, we have devised a special jig (sketch), using 4x2-in. angle irons. It's formed in the shape and size of the folded box, with the far side full-dimensioned and the two adjacent sides only three-quarters the length of the box side.

By pulling the carton sides up and bending the ears back, the box can be inserted into the holder, leaving the front open.

An operator merely weighs cheese and slips it into the partly formed box. Then, aided by the form, he completes the folding and tucking of the ears. Both hands are now free to place the sleeve over the cheese and box.

We have found that by breaking the ears slightly as the box bottom is inserted into the holder, the ears fold into place automatically.

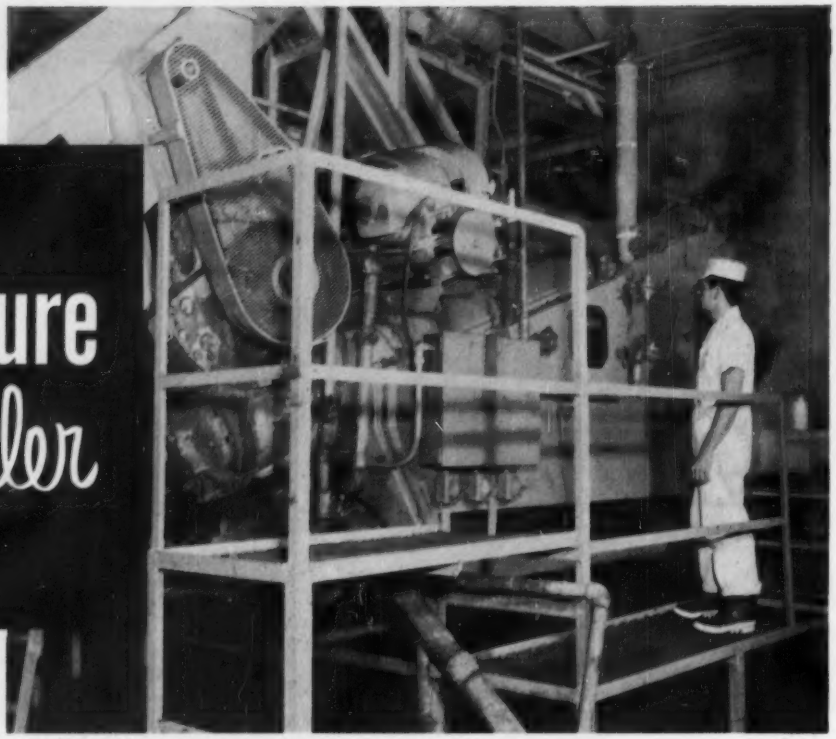
Since adopting this procedure we have decreased the time required per box by 20%.—*Frank E. Gunn, General Manager Arc County Creameries, Inc., Horse Cave, Ky.*

## Improved Tank Cleaning

For cleaning the interiors of tanks and other vessels, rotating-nozzle cleaners have proved effective. These have been used successfully on tanks 20 ft. and more in dia.

Where jet cleaning is applicable, workmen do not have to enter the equipment. Cleaning effectiveness, with rotating nozzle, is reported better and faster than with hand-manipulated hoses.—*Technical Bulletin, General Foods Corp.*

# Hi-Pressure *steam peeler*



*Typical FMC Steamer preparing fruits and vegetables for Gerber's Baby Foods at their Oakland, California plant.*

## Makes Short Work of Tough Skins

It takes an FMC Continuous High Pressure Steamer, with automatic heat penetration control, to really loosen up the tough ones. Such vegetables as carrots, beets and potatoes (certain fruits, too) are quickly and uniformly exposed to steam pressures up to 120 P.S.I.G., which make the job of skin elimination easy, fast and thorough.

Built for various capacity requirements, this machine provides a yield of 10% or more over other methods of loosening skins. As an example of output, carrots are processed at 5 or more tons per hour under 25 to 30 seconds exposure to steam pressure. In addition, there's an extremely low waste factor, there's no damage to sub-surface nutritional layers, and continuous operation reduces the manpower normally required on non-automatic lines.

Want more information? Just mail the coupon today, or call your nearest FMC representative.

**Improved model** boasts many features, including adjustable condensate removal unit; rigid, large diameter turret shaft; hard, smooth plate-stock liners; 1¼" heavy duty pressure-resisting firebox side plates. Built to A.S.M.E. code for up to 120 lbs. pressure.

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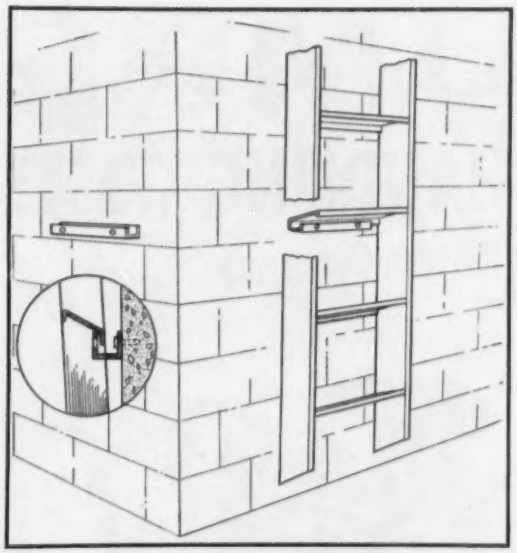
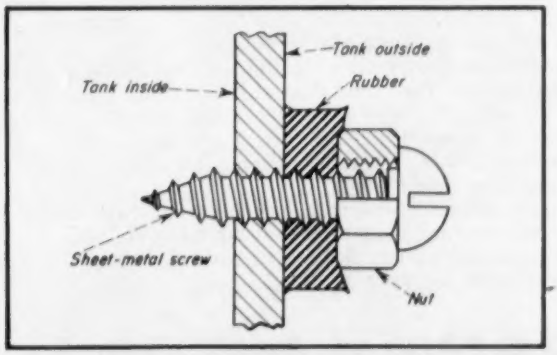


## Wall Bracket for Ladders

Aluminum ladders that are in current use employ rungs made of aluminum strips shaped as semi-channels. At our plant, we have used scrap pieces of this metal to construct a very simple yet effective bracket for hanging this type of ladder against a wall.

We took a piece of 1 x 1 x 1-in. heavy aluminum channel approximately 18 in. long, drilled several ½-in. dia. holes in one of its flanges, and then worked through these holes to drill a couple of ¼ in. holes in the opposite flange and also into the masonry. Thus, we fastened the bracket (see sketch) to the wall.

This bracket has proved to be extremely rugged, yet neat in appearance. Currently, it is used to hang a 12-ft ladder.—*W. C. McCullough, Maintenance Dept., The Coca Cola Co., Los Angeles.*




## Quickly Stops Tank Leaks

Minute, pin-hole leaks caused by corrosion or mechanical accidents occasionally develop in sheet metal tanks.

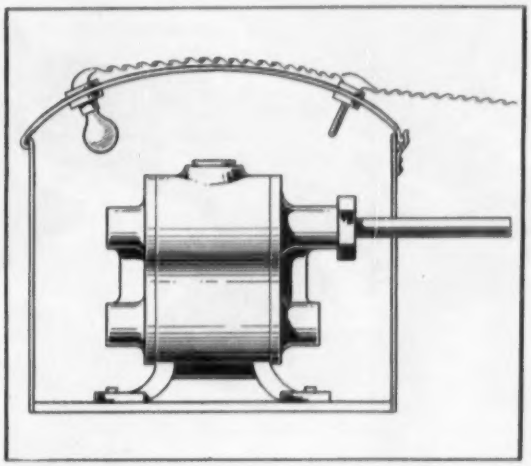
However, this temporary repair, will keep a tank liquid-tight until a more permanent job can be done.

Here's how it is done, quickly and economically:

First, make sure the leak allows the point of a self-tapping sheet-metal screw (sketch) to make a start (enlarging hole if necessary). Over the screw, thread a disk of rubber into which a small hole is centered. Now back-up the rubber with an old nut or washers.

When this sheet-metal screw is inserted into the tank wall, the rubber washer will be compressed into contact with the threads, thus sealing them off. The backing nut or washers will squash the rubber against the tank exterior and blank off the dead or incomplete threads under the head of the screw.

If the tank is filled with oil or a liquid that is damaging to rubber, the sealing disk can be protected by coating it with shellac.—*Clifford T. Bower, 25 Emlyn Rd., London, W. 12, England.*



## Pump-Temperature Control

We have hit upon this simple, inexpensive way of maintaining proper temperature in a pump that handles heavy viscous liquids:

Enclose the pump in a box or fabrication of sheet metal with a removable cover (or equipped with sliding access door in the top surface). This box should be large enough to clear the pump by 6 to 8 in. in all directions, and so prevent the heat applied from being concentrated in any one spot on the pump.

Inside the closure attach a thermostat, and wire to this a light socket which has been fastened to the top of the box. By means of this control, the pump can be held within a narrow range of the temperature required.

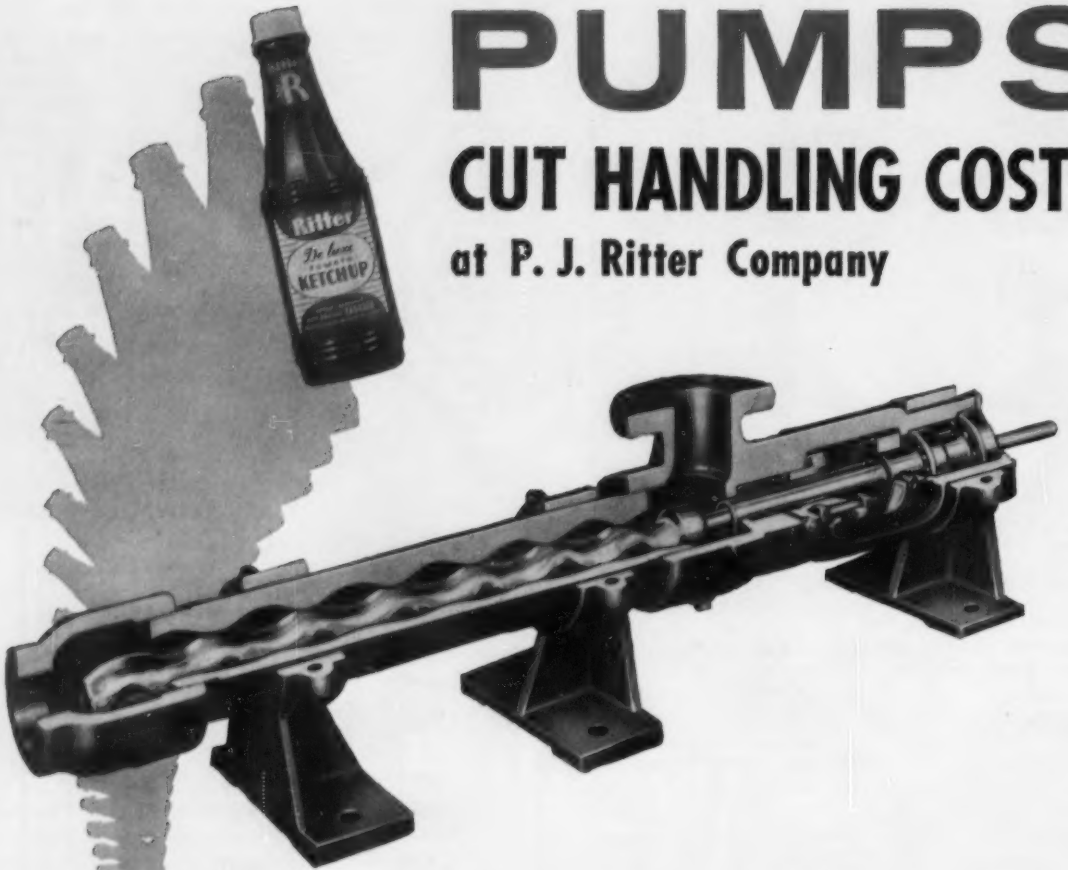
A bulb of 50-75w. is usually adequate for temperature stability. However, if the pump is located where temperature outside the housing drops considerably, insulation around the metal box may be necessary.

If explosion-proof equipment is required, strip heaters may be substituted for the light bulb. In any event, the heating of the closure is intermittent, so the operating cost is low.—*Charles Olson, Professional Engineer, Normal, Ill.*

# MOYNO® PUMPS

## CUT HANDLING COSTS

### at P. J. Ritter Company




*...pumping tomato seeds and 5-15% water*

The Moyno "progressive cavity" pumping principle has enabled thousands of plants to pipe difficult materials that were transported by hand and other expensive means. For example, The P. J. Ritter Co., famous food packers since 1854, have increased efficiency by installing seventeen Moyno Pumps. The one shown at the left is pumping tomato seeds in 5-15% solution at 10 gallons per minute. The pump runs at 600 RPM.

Moyno is the only pump that will handle many difficult materials such as abrasives, pastes, slurries, chemicals, foods, suspended solids, etc., without foaming, aerating, crushing or excessive pump wear.

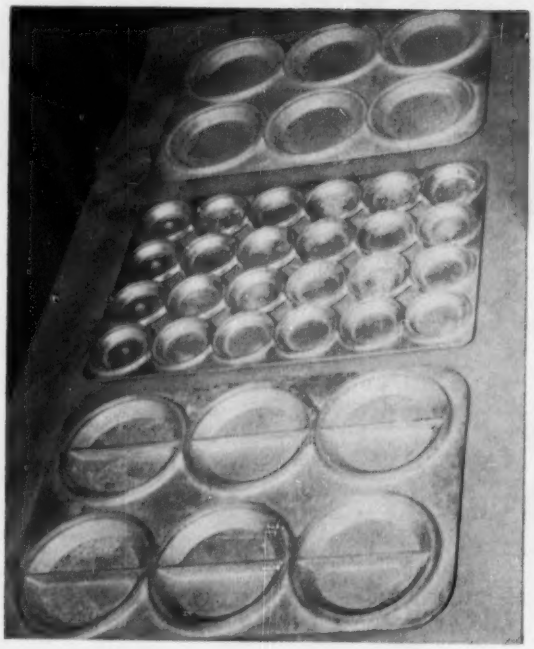
Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us, we'll give you a prompt answer. Send us an outline of your problem today! Write for Bulletin 30-FE.

R&M

**ROBBINS & MYERS, INC.**

SPRINGFIELD, OHIO | BRANTFORD, ONTARIO

Motors | Fans | Hoists | Moyno® Pumps | Propellair® (Industrial) Fans



## Pie Pan Innovations

Some mechanical improvements that aid in pie baking operations have been made at our plant.

Our pans (photo) are noteworthy. Used for preparing and baking many different size pies, these pans are made of cast aluminum. They are formed tray-like in one piece—bun pan size (18x26 in.) containing six molds for standard 9 in. pies or six molds for 8 in. pies or 24 for 4 in. pies.

In addition, we have made multi-unit pans for tart-size pastry—round, oblong, triangular, square, and hexagonal. Another type of special interest is the divided pan, each section of which prod ices a half pie. None of the pans in any of the units is detachable. We find the bake in above-mentioned units is more uniform than in conventional type pans.

A major advantage of our cast aluminum pan is that the units lend themselves so well to automatic handling. A sheet for bottom dough can be hand-laid over the top of the molds and docked in place. However, we have developed sheeters that place bottom dough over a group of molds, after which the dough is machine docked with considerable labor saving.

Again, molds may be filled with fruit or custard, etc., by either hand or machine, and then another sheet of dough placed on top. We also perform the latter operation by machine.

The dough cut-off is made against a raised sharp edge in the casting around each mold. Merely running a roller by hand over the top of the molds will cut the dough for trims.

However, again we conserve labor by running trays by conveyor under a roller that automatically cuts off the excess dough, leaving perfectly formed pies ready to be baked in the same trays in which they were made.

In the divided pans (that form half pies), the roller presses the top piece of dough tightly against the first piece that was docked in the divided sections. The seal at the division between the two pie halves is just as thorough as that around the edges of the pie. Thus two perfect halves of a pie with pastry around all sides is made automatically.

If the half-pie pans are filled by hand, it is possible to use a ball of dough and to dock the pastry into shape and form. However, the entire operation from start to finish can be performed on the half pies automatically.

Trays can be washed by hand or run through machines. Handling of one unit, instead of many, saves time and labor.

And here's one other item of interest: We also have made a filling machine to deposit two different materials into the sides of the divided mold, thus making two half pies of different flavors.

And lastly we have made automatic lifters to remove the pies from the pans.—*F. M. Keathley, Sr., President, Keathley Pie Co., Memphis, Tenn.*

## For Longer Lamp Life

You get longer incandescent lamp life when you use lamps rated from 5 up to 15v. higher than actual line voltage.

True, cost of lighting is thus increased. But there are circumstances where this is justified.

For example, you may have lamps in hard-to-reach locations where it is particularly expensive to replace them or where a burned out lamp is a matter of serious concern.—*Technical Bulletin, General Foods Corp.*

**CAN YOU USE $50?**

**Then here's an opportunity to get it.**

**Send one of your ideas to FOOD ENGINEERING. Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in twelve.**

**Also $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.**

**Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.**

**We'll do the finished writing and drawing for you. Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.**

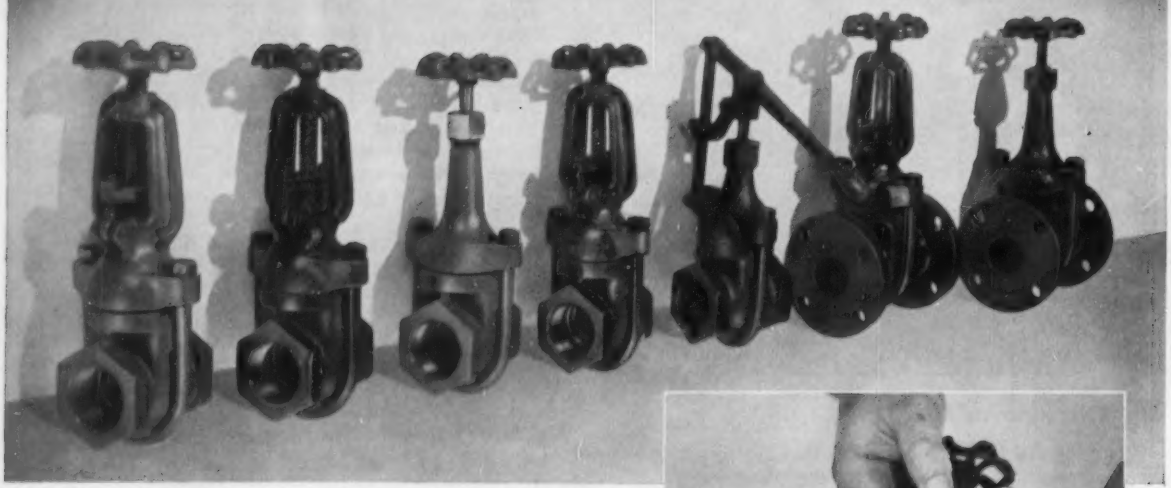
**OCTOBER PRACTICAL IDEA WINNER was "Brush Glueing Discarded," which was sent in by Jack V. Walton, T. W. Gardner Food Co., Winston-Salem, N. C.**

# Eleven lines of WALWORTH Saddle Type Wedge Gate Valves

**Bronze-Mounted — All-Iron — Ni-Resist**

**Outside Screw and Yoke — Non-Rising Stem — Quick Opening**

**Flanged Ends — Screwed Ends**



Walworth saddle-type wedge gate valves are manufactured in eleven different combinations of designs and materials, seven of which are illustrated above.

Saddle type wedge gate valves are easy to take apart and are particularly suitable for lines requiring frequent cleaning. Walworth Saddle-Type Wedge Gate Valves are available in a variety of designs including OS & Y; Inside Screw Rising Stem, and Sliding Stem Quick Opening types—in Bronze-Mounted, All-Iron, and Ni-Resist. All types are designed to permit repacking under pressure in either the open or closed position.

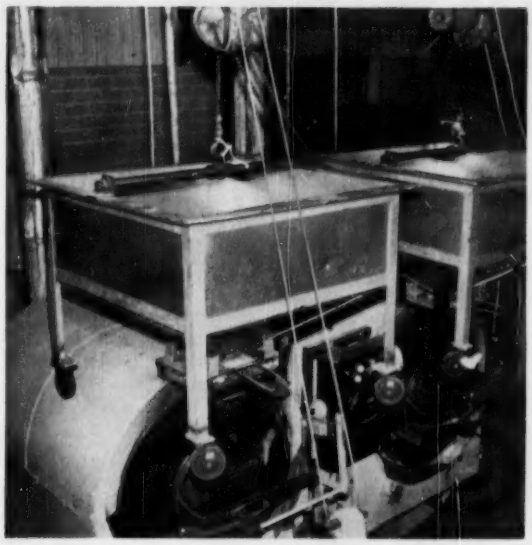
**FOR COMPLETE INFORMATION, See your local Walworth Distributor or write on business stationery for illustrated circular.**

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

# WALWORTH

**60 East 42nd Street, New York 17, New York**

SUBSIDIARIES: ALLOY STEEL PRODUCTS CO. · CONOFLOW CORPORATION · GROVE VALVE & REGULATOR CO. · SOUTHWEST FABRICATING & WELDING CO., INC. · M & H VALVE & FITTINGS CO. · WALWORTH COMPANY OF CANADA, LTD.

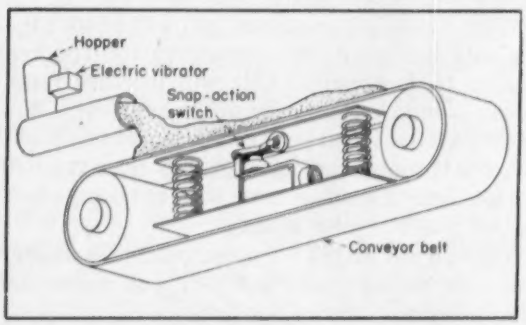


## This Hopper Curbs Split Nuts

At H. W. Lay & Co., Inc., Chamblee, Ga., nuts are fed into roasters from improved hoppers, which are filled on the floor and hoisted into position over the roaster inlets.

Caster-equipped for movement on the floor, each hopper has a cross-bar with "I" bolt for inserting the hoist hook. A slide-gate (photo) discharges nuts from the sloped bottom of the hopper. Electric hoists travel on a tram-rail over the roasters to lift hoppers from the floor and move them into position over either roaster inlet.

Purpose of the hopper is to provide more gentle handling of the nuts, which results in less splits than in conventional handling.—*FE Staff*



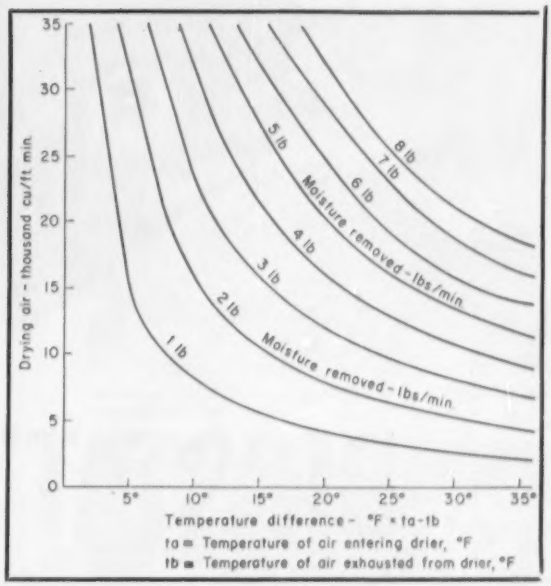

## Maintaining Proper Hopper Flow

To prevent the contents of an overhead hopper from overflowing and failing to feed properly to the conveyor belt below, we installed a snap-action Microswitch to control a vibrator mounted on the cone of the hopper.

The switch, which is fitted beneath a spring-operated platen (sketch) under the belt, is actuated by the weight of the product on the belt.

If flow of material diminishes or stops, the switch is released. This starts the vibrator, which then operates until the hopper again feeds onto the conveyor, whereupon weight of product actuates the switch to shut off the vibrator.

The system greatly extends the life of the vibrator, and danger of fatigue or crystallizing of the metal of the hopper is minimized.—*R. W. Moore, Attleboro, Mass.*




## Way to Control Dehydration

Here's a quick way to determine the approximate moisture removed per minute from a dryer by the exhaust air during dehydration—a method that should be extremely valuable in obtaining more effective drying operations.

By figuring capacity of the fans delivering air to the dryer and obtaining Fahrenheit temperature readings at the air inlet and exhaust, it is possible to determine the approximate amount of water vapor that is exhausted.

As a rough average for commercial conditions, 16,000 cu. ft/min. of air will remove 1 lb. of water for every 5-deg. temperature drop. This can be expressed as—

$$\frac{V}{16{,}000} \times \frac{T}{5} = E,$$

where V = the cfm. volume of air delivered by the fan; T = temperature difference (deg. F.) between air entering dryer and air exhausting; and E = the lb./min. of water evaporated from the material in the dryer by the exhaust air.

The accompanying chart will be found useful for checking the operation and design of dryers of all types. —*Jess O. Reed, Development Engineer (Retired) USDA., Washington, D. C.*

Report to processors:

# BIOSTAT® ANTIBIOTIC

## *offers simple, profitable way for you to market poultry*

**If you are now using, or considering using antibiotic treatment to extend freshness time, you should know the important facts about BIOSTAT. It offers every poultry processor a number of unique advantages.**

BIOSTAT is produced only by Chas. Pfizer & Co., Inc., world's largest producer of antibiotics, and a supplier of quality ingredients for the food industry for over a century. The active ingredient of Pfizer BIOSTAT—PA (poultry application) is the antibiotic oxytetracycline. In thousands of tests and in experimental work covering more than two years, BIOSTAT has proved extremely effective in delaying bacterial spoilage. Your chilled whole poultry will remain fresh 50-100% longer when BIOSTAT is added to chill tanks.

### FDA ACCEPTED

BIOSTAT has been accepted by the Food and Drug Administration for use on poultry to retard bacterial spoilage. All trace of the antibiotic which protects freshness is destroyed by cooking.

With BIOSTAT treatment you will be sure that the retailer can offer consumers the freshest tasting birds possible. This will increase repeat sales . . . build his broiler business, *and yours!* With BIOSTAT treatment your retailers will also be able to order larger quantities of poultry from you with far less fear of spoilage from weekend carry-overs, or bad weather sales slumps.

You can use BIOSTAT when you freeze poultry, too . . . to retard bacteria before you freeze and after consumer thaws the bird.

### PREPACKAGING

For the future, antibiotic treatment promises an extremely important development in poultry marketing — reduced labor cost by the elimination of cutting-up and tray-packaging at retail stores. Pfizer is now working on techniques of treatment that will make tray-packaging at your plant a practical reality. At the present time, any antibiotic

## EXTRA ADVANTAGES YOU GET WITH BIOSTAT

■ **FAST ACTING**—BIOSTAT has a high rate of solubility...dissolves *instantly* in chill tank water...*does not foam.*

■ **METAL CONTAINER**—BIOSTAT is delivered to you in special metal containers that *will not* absorb moisture...*will* keep product in good condition. The containers have polyethylene liners. Enclosed in each container is an *easy-to-use measuring scoop.*

■ **PLUS INGREDIENT**—BIOSTAT contains citric acid which increases acidity and thereby also helps inhibit bacterial growth.

■ **MORE CONCENTRATED**—BIOSTAT is a 20% concentration of antibiotic activity. This means you order less weight. It simplifies handling.

■ **SPECIAL SERVICE**—You will find details on this important "extra" below under the heading PFIZER POLICY.

BIOSTAT comes to you in a convenient, 1 gallon *metal* container with a polyethylene liner and a handy measuring scoop.

When you add BIOSTAT to your chill tank, you'll find it dissolves instantly. Does not foam.

# TREATMENT

## *that stays fresh longer*

cleared by the government for addition to the water in a poultry chill tank inhibits bacterial action on the surface of a whole bird. This type of treatment is very effective in delaying spoilage, but its maximum effectiveness lasts only until the bird is cut up and new surfaces exposed to bacteria.

Wing clips featuring your brand name carry only such labeling of antibiotic treatment as required by government.

### PFIZER POLICY

Pfizer offers you a *free sample* of BIOSTAT (50 grams) and technical help in starting antibiotic treatment. In addition, Pfizer offers a special introductory wing clip service to aid processors in taking immediate commercial advantage of the benefits of BIOSTAT. **No promotional labeling of BIOSTAT is required. As in the past, Pfizer leaves control of end product merchandising to processors.**

Write to Pfizer today for your free sample of BIOSTAT and full details on how BIOSTAT antibiotic treatment can help you profit through marketing poultry that stays fresh longer.

*Quality ingredients for the food industry for over a century*

Pfizer

**CHAS. PFIZER & CO., INC.**
*Chemical Sales Division*
630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Texas

# TRI-CLAMP®

## Stainless Steel Fittings and Valves assure superior product quality

Tri-Clover "cleaned-in-place" TRI-CLAMP lines are used for all movement of syrup into and out of these tanks in the syrup storage room of one of the country's largest bottlers.



Recirculation cleaning pumps and lines are connected with TRI-CLAMP Fittings at this end of the syrup storage room.

TRI-CLAMP Snap-Action Spring Clamp, with toggle locking device securely attached.

TRI-CLAMP Tee available in 1", 1½", 2", 2½", 3" and 4" sizes.

TRI-CLAMP 90 degree Sweep Ell available in all sizes.

TRI-CLAMP 3-Way Lift Type Plug Valve—complete range of types and sizes.

Maintaining the constant high quality of your bottled product means continued customer satisfaction and repeat order business. Follow the lead of progressive bottlers who are modernizing their plants by installing Tri-Clover's gleaming Stainless Steel TRI-CLAMP Fittings and Valves.

TRI-CLAMP Fittings employ a new idea in sanitary fitting design and fabrication. At the flick of the wrist you can assemble or disassemble a positive, sanitary, leak-tight joint. Combining this time and money saving feature with continued trouble-free fitting life and substantial savings in original cost adds up to more profit for your investment dollar.

Our engineering staff, employing many years of specialized experience and thorough know-how in liquid handling will work with you for a sure and economical solution to your processing line problems.

**LADISH CO.**

*Tri-Clover Division*

*Kenosha Wisconsin*

TRI-CLOVER

5256

***remember this***—**Tri-Clover is your one dependable source for Sanitary Fittings, Valves, Pumps, Tubing and Allied Specialties, for both "cleaned-in-place" and "take-down" lines.**

*See your nearest*
**TRI-CLOVER DISTRIBUTOR**
**Export Dept., 8 S. Michigan Ave., Chicago, U.S.A.**
**Cable TRICLO**

# PICK THE RIGHT FAN NOW

## —and have no regrets later

| "BUFFALO" FAN | APPLICATIONS | CHARACTERISTICS |
|---|---|---|
| *Type BL Fan* | Supplying large ventilation, air conditioning and air cleaning systems. Type BL is used in Class I service, while Type BLH is designed for Class II-IV (high pressure) service. Write for BL Bulletin F-101 and BLH Bulletin F-200. | Extremely quiet and high in efficiency; stable performance from zero pressure to shutoff; non-overloading regardless of system pressure; available in capacities up to 500,000 cfm, all drive arrangements and discharge angles. |
| *Type CR Fan* | New "Buffalo" Radial Blade Fan for severe industrial services such as handling abrasive dust-laden air and economical mechanical draft. The CR's high capacity, high pressure characteristics often mean a smaller fan for the job. Write for Bulletin FD-205. | Mechanical efficiency above 78% over a broad range — high volume, high pressure characteristics, also high resistance to abrasion. Long life under severe conditions. An economical fan to own and operate. |
| *Package Propeller Fans* | For wall or window-mounted ventilation and exhaust; capacities from 500 to 250,000 cfm. Available in non-sparking, high temperature and corrosion-resistant models, also package roof ventilators. Write for Bulletins FM 1234 and FM 2345. | Husky, die-stamped blades and frame. Proven unusually high in efficiency in hundreds of installations. Compact, easy to install packages for economical ventilation of a single room or a whole building. |
| *Belted Vent Sets* | For zone ventilation where quiet and flexibility are required. Capacities from 1000 to 20,000 cfm. Write for Bulletin 3720. | Efficient, quiet, non-overloading. Simple package installation, indoors or out. Capacity adjustable by changing sheaves. |
| *Industrial Exhausters* | Moving materials or exhausting fumes, mists, dust; available with heat slinger for temperatures up to 1000° F. Write for Bulletin 3576. | Heavy all-welded steel plate for strength, smooth interior surfaces for minimum friction. Interchangeable Air Wheels or Material Wheels. |

**BUFFALO FORGE COMPANY**

**BUFFALO, NEW YORK**

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING



For more data, circle this page number on card at back →

## Clarity Measurements in Filtration

**by Paul W. Leppla,** *Technical Director*

Filtration efficiency is usually measured in terms of flowrate and clarity. Flowrate is readily measured in most plants; however, clarity measurements involve the most difficult aspects of filtration technology. Consequently most industries rely upon visual evaluation of filtrate clarity, which is only semi-quantitative at best and occasionally is purely subjective.

Critical evaluation of filtrate clarity requires instrumental measurement. A number of satisfactory instruments of U.S. manufacture are available. Some measure transmitted light, a questionable technique since few of these instruments discriminate between bleaching of soluble color and the removal of suspended particulates. The measurement of Tyndall or scattered light is much preferred.

Too, the problem of absolute standards is not yet resolved, resulting in confusion on clarity measurements from one laboratory to another. One instrument company has available a series of calibrated standards, which are claimed to be stable, and at least one technical society is working on the development of absolute reference standards so that identical measurements will be possible in different laboratories.

Under these circumstances, evaluating a series of diatomite filteraids is extremely difficult. While Filteraid A may have 90% of the clarification efficiency of Filteraid B in a raw sugar solution, the relative rating in a pectin system may be only 60%. Moreover, the relative clarification of two filteraids with respect to the same liquid may change markedly depending upon the conditions of the test.

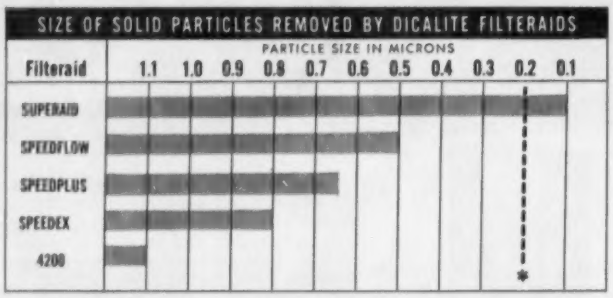
Because of the many variables involved which can influence results to an enormous degree, it is imperative that comparative tests duplicate, as nearly as possible, actual plant conditions. Since often this is difficult, many plants rely on the wealth of experience available to them from a leading supplier in this extremely complex field, experience covering many types of liquors, filters and operating conditions.

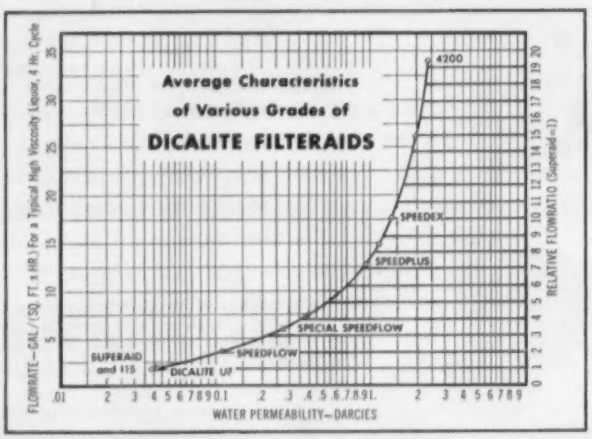
The chart in the accompanying advertisement illustrates a significant step forward in this difficult field recently achieved in the Dicalite laboratory. While it is possible to calculate the average pore size of a filter cake, our scientists have known for some time that particles much smaller than the calculated pore diameter are readily retained by diatomite filteraids. By carefully preparing suspensions of uniformly sized particles in the 1-10 micron range, and conducting laboratory filtration tests under carefully controlled conditions, they were able to determine exactly what size particles can be removed by each of the grades of Dicalite filteraids.


# DICALITE FILTERAIDS

## let you set "nets" to catch all sizes of "fish"

Of course, there's one fundamental difference between fishing and filtration . . . usually, in filtration you're interested in the filtrate, not the 'fish.' But you still have to set the right size 'net' to get the 'fish' out . . . and Dicalite provides a full range of superior filteraids to do just that. The two charts below show (1) the sizes of particulates trapped by different grades of Dicalite and (2) the flowrates to be expected from these grades in typical filtration applications. These data will give you a clear indication of the Dicalite Filteraids which should provide the optimum balance of clarity and flowrate for your particular operation.


SIZE OF SOLID PARTICLES REMOVED BY DICALITE FILTERAIDS
PARTICLE SIZE IN MICRONS
Filteraid
1.1 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
SUPERAID
SPEEDFLOW
SPEEDPLUS
SPEEDEX
4200
*0.2 MICRON — Theoretical limit of resolution of optical microscope. Few microscopes achieve it.
80.0 MICRONS — Smallest particle size visible to the unaided eye at 10" distance.

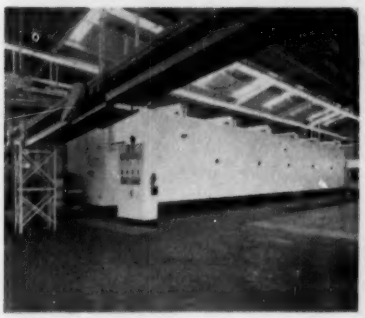


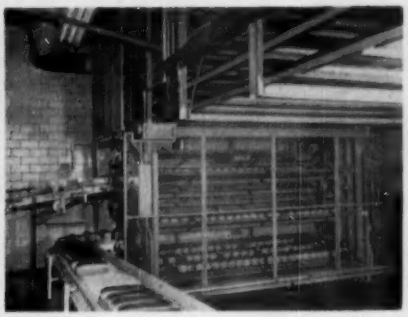

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

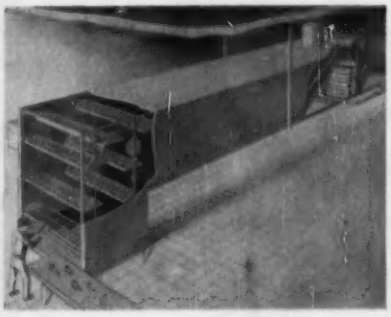
WRITE TODAY FOR INFORMATION OR TECHNICAL SERVICE ON THE USE OF DICALITE IN YOUR PROCESSING

**DICALITE DIVISION** • Great Lakes Carbon Corp., 612 So. Flower St., Los Angeles 17, Calif.

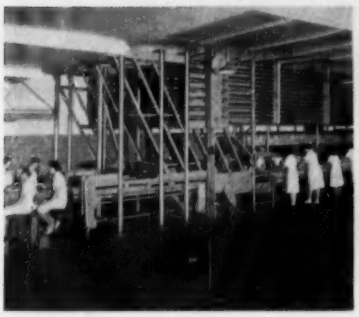
# Processing by Multi-Tier

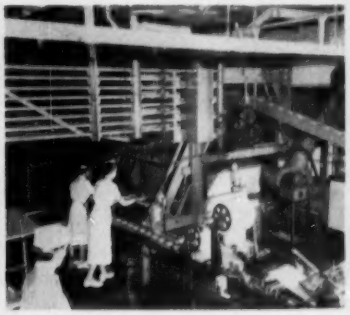




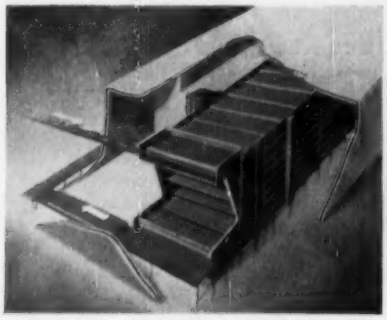


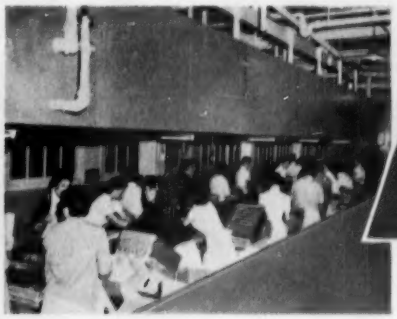
..Wax Moulding.....Bread Cooling.....Shoe Drying.....





...Candy Cooling.....Pie Cooling.....Fish Cooling and Freezing





DO YOU

- Heat
- Dry
- Bake
- Pasteurize
- Cool
- Freeze
- Store
- Cure

Ice Cream Hardening .....Biscuit Cooling.....

*If so, write for descriptive Bulletin No. 55-12.*

*40 years of Greer Engineering Development have paved the way to Continuous Multi-Tier Processing for industry.*

*Proven results: Improved Quality — Space Saved — Costs Cut — Production Increased*

## J. W. GREER COMPANY

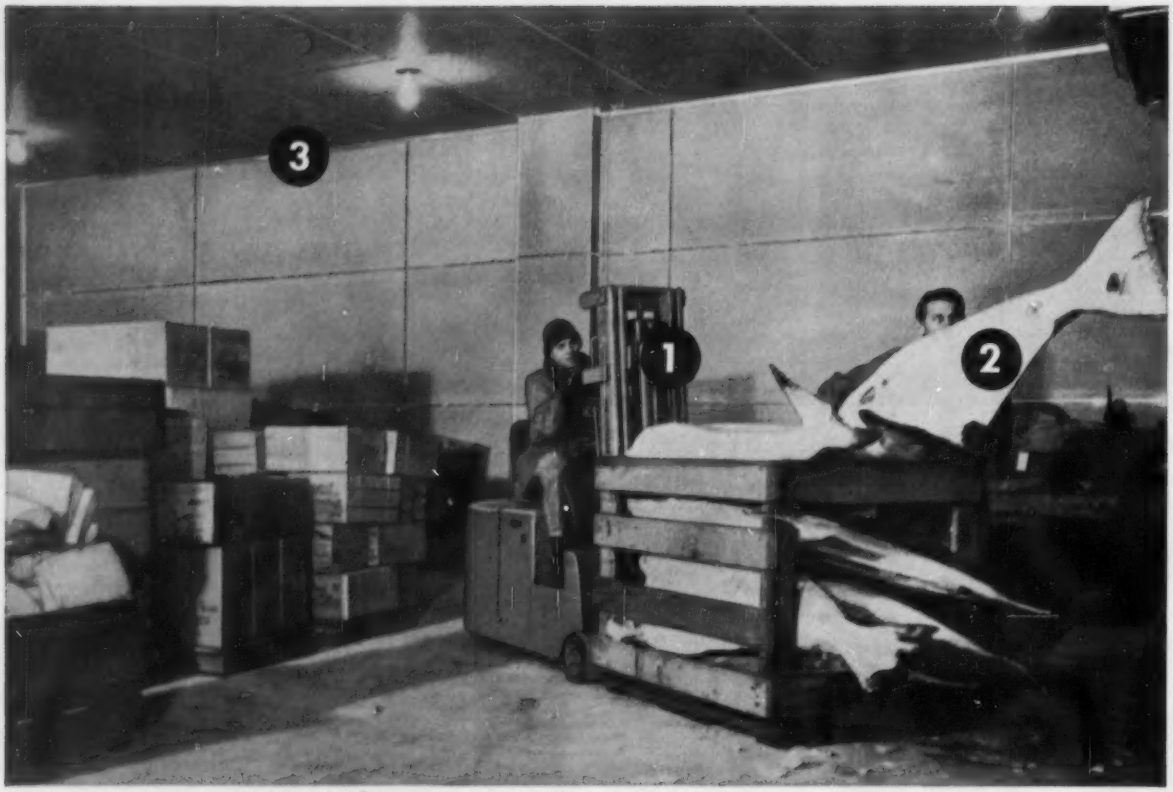
GREER

**WILMINGTON, MASSACHUSETTS**

Sales Engineering Offices: Chicago, Ill., and San Francisco, Calif.



For more data, circle this page number on card at back →




# LOOK!... 3 good reasons why your cold-room walls need J-M Asbestocite

This typical cold storage scene at the Long Beach (California) Seafoods Company helps explain the trend to Asbestocite® sheets as a protective finish over refrigeration insulation.

**Take the liftruck, for example—**

It symbolizes the kind of rough service for which Asbestocite is designed. This doesn't mean that liftrucks should be smashed into Asbestocite walls. But short of this, you'll find Asbestocite will withstand literally decades of hard usage.

**... and the fish—**

This is one of many foods that give off strong or offensive odors. Here Asbestocite really pays off! It won't pick up odors to contaminate delicate foodstuffs. And it cleans quickly, easily with ordinary soap and water.

**... and the wall appearance—**

Neat, attractive walls of Asbestocite encourage cleanliness, pass the most critical inspection. Asbestocite never needs protective coatings—simply will not rot, corrode or burn.

For further information, write to Johns-Manville, Box 14, New York 16, N.Y.

**Comes in large, easy-to-handle sheets**

Asbestocite is made of asbestos and cement formed under high pressure. It is attractive, natural gray in color and has a hard, smooth finish on one side. Available in sheet sizes up to 4'x12' ... in thickness up to ½".

## *Short Specifications for typical cold-room wall*

**Insulated Cold Room Finish.** Shall be $\frac{1}{16}$" thick Johns-Manville Asbestocite secured to treated wood nailers with wood screws or to T-bars by means of clips as the case may be.

**Refrigeration Insulation.** Shall be Johns-Manville Rock Cork sheets —" thick, installed in two layers using Rock Cork asphalt or other approved adhesive. The second layer shall break all joints with the first.

**Johns-Manville Rock Cork refrigeration insulation has been the choice of refrigeration engineers everywhere for over half a century. It offers these advantages: High moisture resistance—sanitary, odorless service—low conductivity—long service life—top structural strength.**

**Johns-Manville *first-in* INSULATION**

**MATERIALS · ENGINEERING · APPLICATION**

DOW

# Vive La Vanillin!

**Rapid solution rate and rich vanilla flavor make it outstanding for food products**

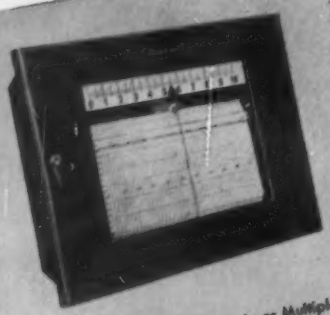
Whether it's wild cheering or silent approval is immaterial—the fact remains that a lot of nice things are being said about Vanillin, U.S.P., a highly effective Dow aromatic.

Vanillin simulates *the vanilla bean* in its full richness of flavor—as customer reports and panel tests indicate strongly. Produced by a unique process, Dow Vanillin has excellent light stability. Add to that a very fast rate of solution and you have an extremely effective food flavor additive.

*Better flavor means more sales*—and that's where *you* come in! You can give your food products more sales-appeal by specifying Vanillin, U.S.P. Want to see its effectiveness firsthand? You can very easily by requesting, on your letterhead, samples and further information from THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. AR 872D-1.

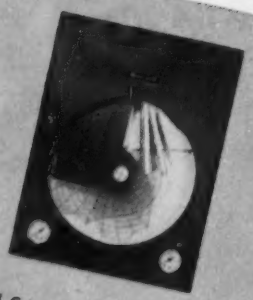
*you can depend on DOW AROMATICS*

DOW



Strip Chart Recorder—Single or Multiple Point . . . Records all types of variables. Choice of pen speeds and chart speeds.

Recording Wet and Dry Bulb Thermometer Controller . . . 2 ink records. Electric or pneumatic control, both pens.

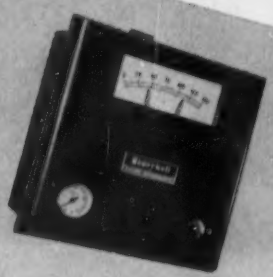


Integral Cam Programmer . . . Enables complete 24- or 168-hour program to be precast. Electric or pneumatic control on one or both pens.

Recording Thermometer Controller . . . Wide choice of control systems. 2-pen recorders available with choice of control.

Circular Scale Controller . . . Scale is over 2½ feet long. Rotates to align indices for 12 o'clock reading. Available in all electric control forms.

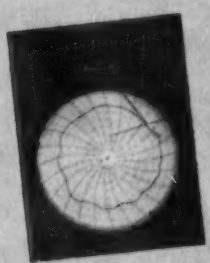
One —



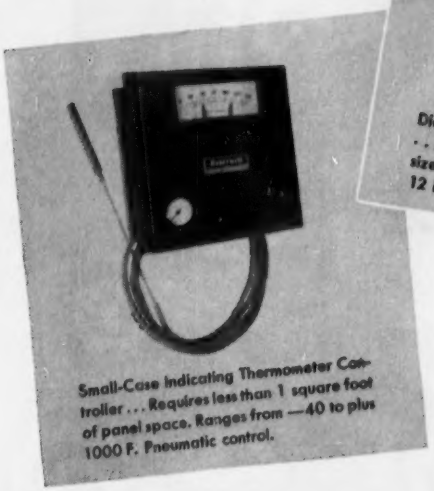
Small-Case Indicating Pressure Controller . . . Requires less than 1 square foot of panel. Pneumatic control.

Precision Indicator . . . Highly accurate indicator for all variables, standard or special, for a variety of services.

Flow Meter—Evenly Graduated . . . Also available with electronic integrator to totalize flow, as indicated on a direct-reading counter.

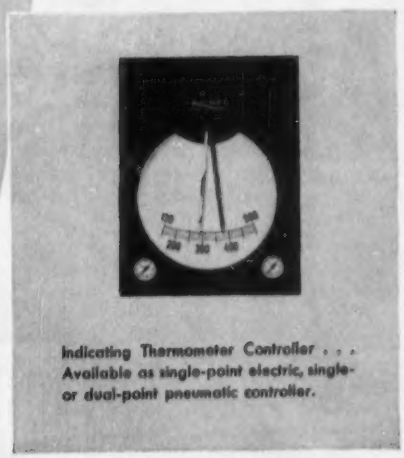


Recording Pressure Controller . . . Wide choice of control systems. Control on either or both pens of 2-pen model.



Small-Case Indicating Thermometer Controller . . . Requires less than 1 square foot of panel space. Ranges from —40 to plus 1000 F. Pneumatic control.

Diaphragm Control Valve—Series 800 . . . For heavy-duty service. In standard sizes from 1 to 8 inch single seated—to 12 inch double seated.



Indicating Thermometer Controller . . . Available as single-point electric, single- or dual-point pneumatic controller.

# —Stop SHOPPING...

WHETHER it's temperature, pressure, pH, flow, liquid level, humidity, or any other important variable you want to measure or control, Honeywell makes just the instrumentation for you. Our line is as broad as the food industry's requirements . . . you can choose exactly what you need.

This means you get all the instrumentation your process requires from a single source, so there is undivided responsibility for the complete installation. And you are assured that equipment suggested for your process is recommended without bias. With a complete line there is no need to over-sell or under-equip.

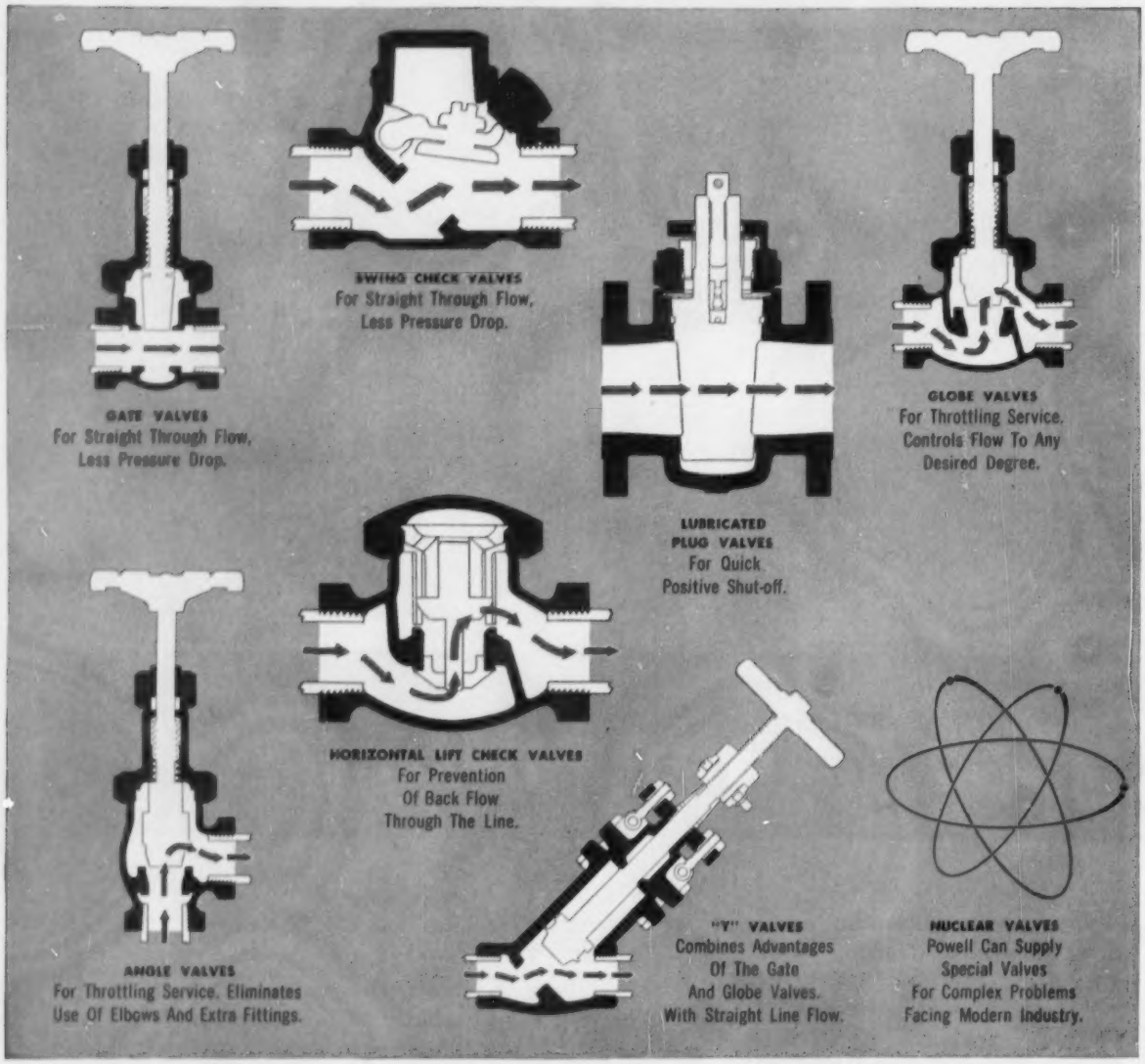
For the new process, the modernization program, or a replacement problem, find out how Honeywell can go to work . . . anywhere in the food industry. Call your nearest Honeywell sales engineer. He's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

MINNEAPOLIS
**Honeywell**
BROWN INSTRUMENTS

*First in Controls*

# POWELL
## for all valve needs




## for every flow control problem there is a right Valve

Powell can supply this right valve—*made right* of the right material*. Every part of every valve must pass rigid inspection. And as a final step in manufacture, every Powell Valve has *Performance Verified* through an *actual line test.*

As an aid in selecting the right valve, the basic valve designs are illustrated here. For complete information on the wide range of sizes and materials available in each type of the basic valves illustrated above, consult your Powell Valve distributor. If none is located near you—or if you have a special flow control problem—write direct to The Wm. Powell Company, Cincinnati 22, Ohio.

PERFORMANCE
PV
VERIFIED

**The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR**

# POWELL VALVES

*BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.



← For more data, circle this page number on card at back

# How LINK-BELT'S complete screw conveyor service

# saves you time
# spares you details

## Here's a single, all-inclusive source for standard or special requirements

This four-point program provides quick and easy answers to any screw conveyor problem. Link-Belt offers you the widest range of component types and sizes. For example, you choose from 17 basic screw designs—in any suitable metal to meet temperature, corrosion, sanitation, abrasion and other requirements . . . in a full range of diameters, gauges and pitches. Whatever you need in components . . . and to whatever extent you require engineering counsel — Link-Belt will devise a system "tailored" to your specific needs. Ask your nearby Link-Belt office or authorized stock-carrying distributor for 92-page Data Book 2289.

SCREW CONVEYORS are readily adaptable to inclined (left), horizontal or vertical handling of bulk materials.

1. **ANALYSIS AND ENGINEERING** service is provided by a district sales office in your area. Link-Belt district engineers can quickly ascertain the best conveying arrangement for your specific application.

2. **COMPLETE LINE OF SCREW CONVEYOR COMPONENTS** and related elevating, conveying and power transmission equipment is your assurance that specific needs will be fulfilled most efficiently and economically.

3. **EASY ERECTION** is achieved because of prefitting, match marking, close-tolerance manufacturing and layout drawings. Link-Belt will handle entire erection assignment if you wish.

4. **SATISFACTORY PERFORMANCE** is assured when you rely on Link-Belt as a single-contract source for your complete system. We will accept full responsibility for placing it in operating readiness for you.

**LINK-BELT**

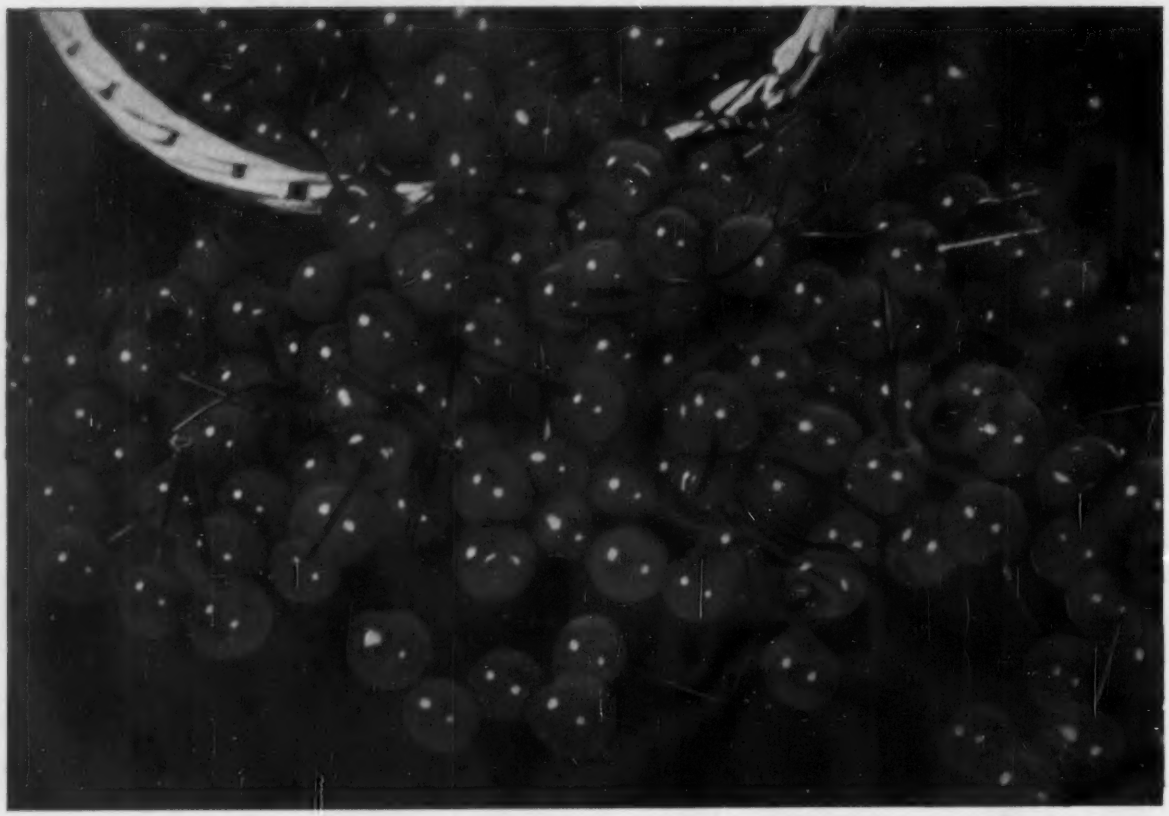
**SCREW CONVEYOR EQUIPMENT**

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,288

**LINK-BELT'S COMPLETE LINE OF INTEGRATED COMPONENTS INCLUDES:**

# CLEARJEL

MODERN FRUIT PIE STABILIZER



## for pies with crystal-clear SPARKLE

What creates the sparkle? Brilliant fruit colors sparkling through crystal-clear fruit juice—stabilized with CLEARJEL, National's modern fruit pie stabilizer.

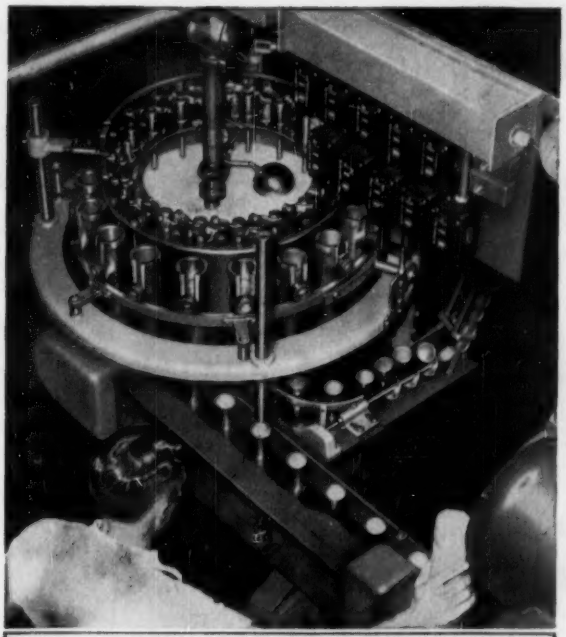
CLEARJEL is processed from a unique hybrid corn grown under special conditions for National. Its distinctive properties are ideal for pie fillings:

- Remains clear after baking
- Leaves no cereal after-taste
- Maintains viscosity while hot
- Minimizes oven boil-out
- Keeps fruit uniformly dispersed

Bake a test pie with CLEARJEL. Fillings have just a semblance of flow—with Full Clarity! Full Color! Full Flavor! See the difference. Write for free recipes and a free CLEARJEL test sample. Or ask your jobber for CLEARJEL.

National STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11



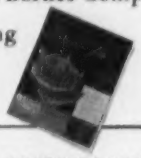
# 7 features LIBRASCOPE PISTON FILLER that cut costs

W. F. & John Barnes offers a filling machine for liquids and semi-solids that gives you all the refinements of accepted and proved practices, plus new and unique operating features that assure greater economy. The Librascope Filler is your key to greater profits because it is engineered to cut product waste, filling cost and save on maintenance expense. Specify the Librascope Filler for these outstanding features:

- PRECISE CONTROL BY ECCENTRIC CAM ADJUSTMENT — saves product waste, eliminates overfilling.
- METAL TO METAL DISCHARGE SEAT — assures more positive closure, prevents leakage of product.
- NO-CAN-NO-FILL ATTACHMENT — returns product to tank if no container is present, cuts product waste.
- RAPID FILLING — fills up to 1,000 containers per minute, reduces processing cost per unit.
- UNIQUE SELF-CLEANING FEATURE — eliminates product build-up, eliminates need of frequent cleaning.
- EASY REMOVAL OF VALVES AND PISTONS, SIMPLE CLEAN-OUT PLUG — means easy cleaning, cuts maintenance costs.
- INDIVIDUALLY ENGINEERED — designing for your special production requirements means maximum efficiency.

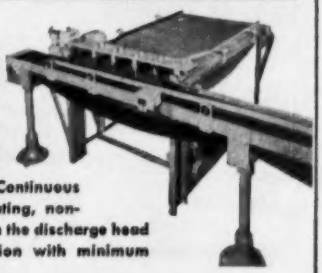
Librascope Fillers bring to the food industry new concepts of precision, speed and superior sanitation. Available in top fill, bottom fill or gravity fill, you'll find a model especially suited to your needs. Manufactured by Librascope, Inc. Exclusive Distributor: W. F. & John Barnes Company.

***Write*** for free brochure illustrating and describing the complete line of Librascope Fillers.



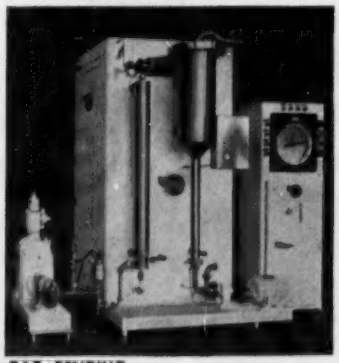
**SEE W. F. & JOHN BARNES FOR OTHER PROFIT-MAKING UNITS**

**SINGLE FILER**



**Designed especially to suit your needs for high-speed glass unscrambling, handles up to 600 jars per minute. Gentle handling even at extremely high speeds. Easy to operate and maintain. Continuous operation of gently oscillating, non-scratching bronze fingers on the discharge head affords maximum production with minimum container damage.**

**BARNES ROTO-JET HEAT EXCHANGER**



**New heat exchange system utilizing steam injection for sterilizing liquid and semi-liquid products. Purified steam is injected directly into the product without heat loss, insuring maximum efficiency and economy. Unique control system maintains processing temperatures within ±½-degree F., and exacting instrumentation affords balanced moisture content.**

**PAT. PENDING**

**W. F. & JOHN BARNES CO.** *FOOD & CONTAINER SECTION*
**407 SOUTH WATER STREET • ROCKFORD, ILLINOIS**

Retort Basket Loaders and Unloaders
Dole Aseptic Canning Equipment • Universal Case Packers

Better Machines Since 1872



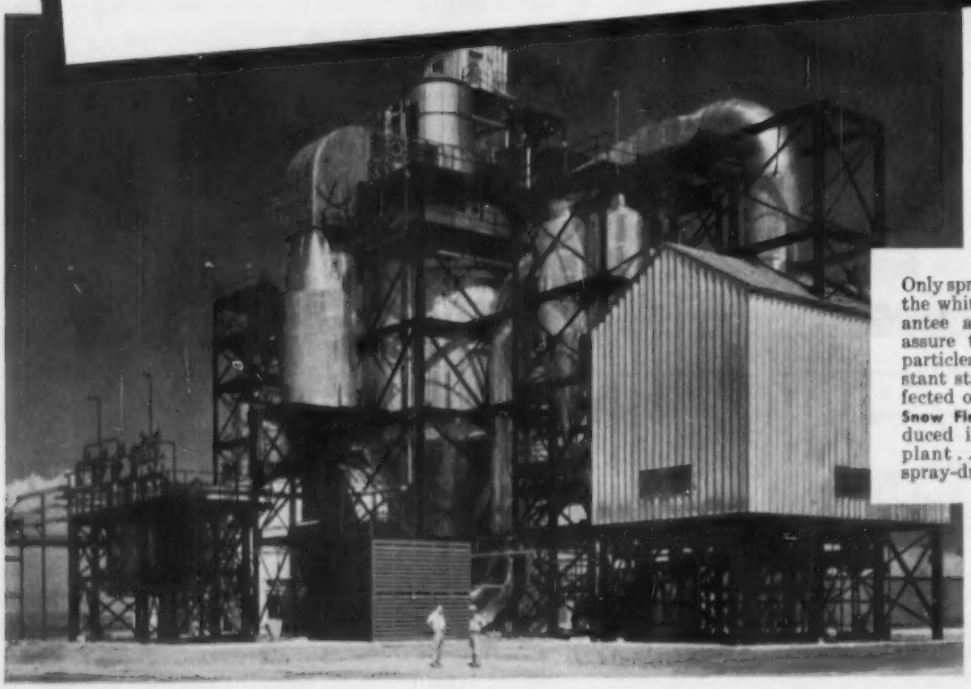
For more data, circle this page number on card at back →

**NOW!** *A completely new food ingredient . . .*

# SnowFlake®

**ONLY SNOW FLAKE INSTANT STARCH GIVES YOU ALL THESE IMPORTANT ADVANTAGES**

1. Completely pre-cooked under rigidly controlled conditions.
2. Pure, all-white, flavor-free cereal starch.
3. Fine particles of uniform size—flows freely.
4. Disperses evenly in liquids and solutions.
5. Low moisture content means greater stability.
6. Thickens instantly and completely.
7. Compatible with other food ingredients.
8. Assures superlative full-bodied smoothness.
9. Inherent viscosity control for easier reconstituting of dry mixes.



**Ultra-modern Spray-Dryer at Corn Products New Corpus Christi Plant**

Only spray-drying can preserve the whiteness of starch, guarantee a stable product and assure the fine, uniform-size particles so essential to an instant starch. Tested and perfected over a period of years, **Snow Flake** is now being produced in this newly erected plant . . . America's first for spray-drying starch.



← For more data, circle this page number on card at back

# Instant Starch

*Pre-cooked, spray-dried to set new standards for instant starch:*

- **Greater purity**
- **Faster thickening**
- **Flavor-free**
- **Superior reconstituting agent**

**SNOW FLAKE**—the world's first spray-dried instant milo starch available in commercial quantities—provides a new standard of purity, stability, quality and convenience. Ideal for instant puddings, frozen and dry mixes, soup and gravy powders, sauce bases, dessert preparations, confectionery products, bakery toppings, salad dressings and other foods, **Snow Flake** opens up almost limitless possibilities for the progressive processor. Consider these major advantages:

**GREATER PURITY** . . . because **Snow Flake** Instant Starch is spray-dried, comes into contact with nothing but clean, pure air and sanitary, stainless steel.

**FASTER THICKENING** . . . because **Snow Flake** Instant Starch is pre-cooked, and because spray-drying produces finer, more uniform particles which dissolve more quickly.

**FLAVOR-FREE** . . . because spray-drying draws off moisture more quickly, with no danger of harmful effects to which starches are subjected in roll-drying.

**SUPERIOR RECONSTITUTING AGENT** . . . requires less critical measurement of water to produce satisfactory gelation in reconstituting dry mixes.

**ASK THE MAN FROM CORN PRODUCTS**—His experience and knowledge of the food field are available. He'll be glad to give you additional information, and help you utilize new **Snow Flake** Instant Starch to best advantage.

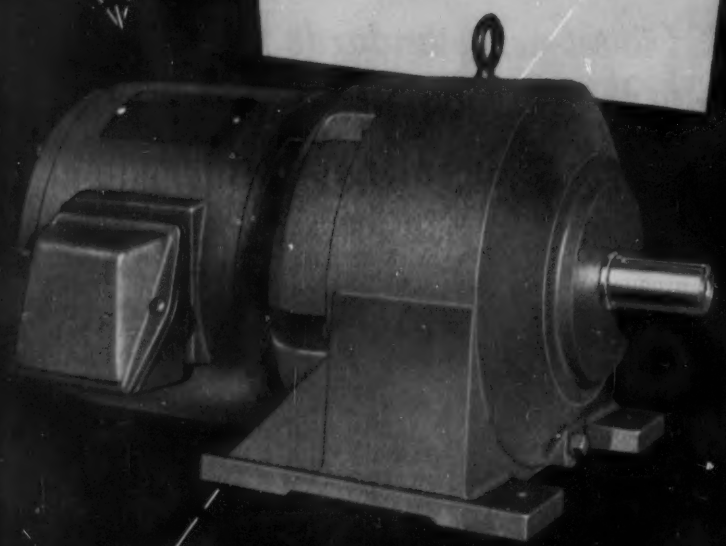
**CORN PRODUCTS REFINING CO.**

17 Battery Place, New York 4, N. Y.



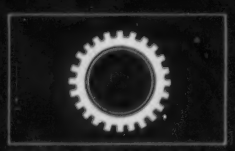
For more data, circle this page number on card at back →

# Don't overlook what you can't see



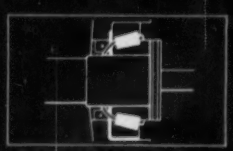
You can't always see what makes a gearmotor outstanding. It's the attention paid to small design details that makes the difference. Here are a few of the details that make the new Reliance Gearmotor stand above the rest.

**FOOLPROOF METERMATIC** motor bearing lubrication and oil bath gear lubrication for long-life protection against wear.



**INDUCTION HARDENING** of the tough alloy steel gears gives a perfect combination of wear resistance and strength.

**SIMPLIFIED GEARING** with few moving parts reduces friction losses and lessens chances of breakdown.



**THRUST BEARINGS** handle heavy overhung loads safely by placing strain on the frame instead of the shafts.

*Find out the complete story for yourself— contact your Reliance representative or write for Bulletin E-2408.*

E-1509

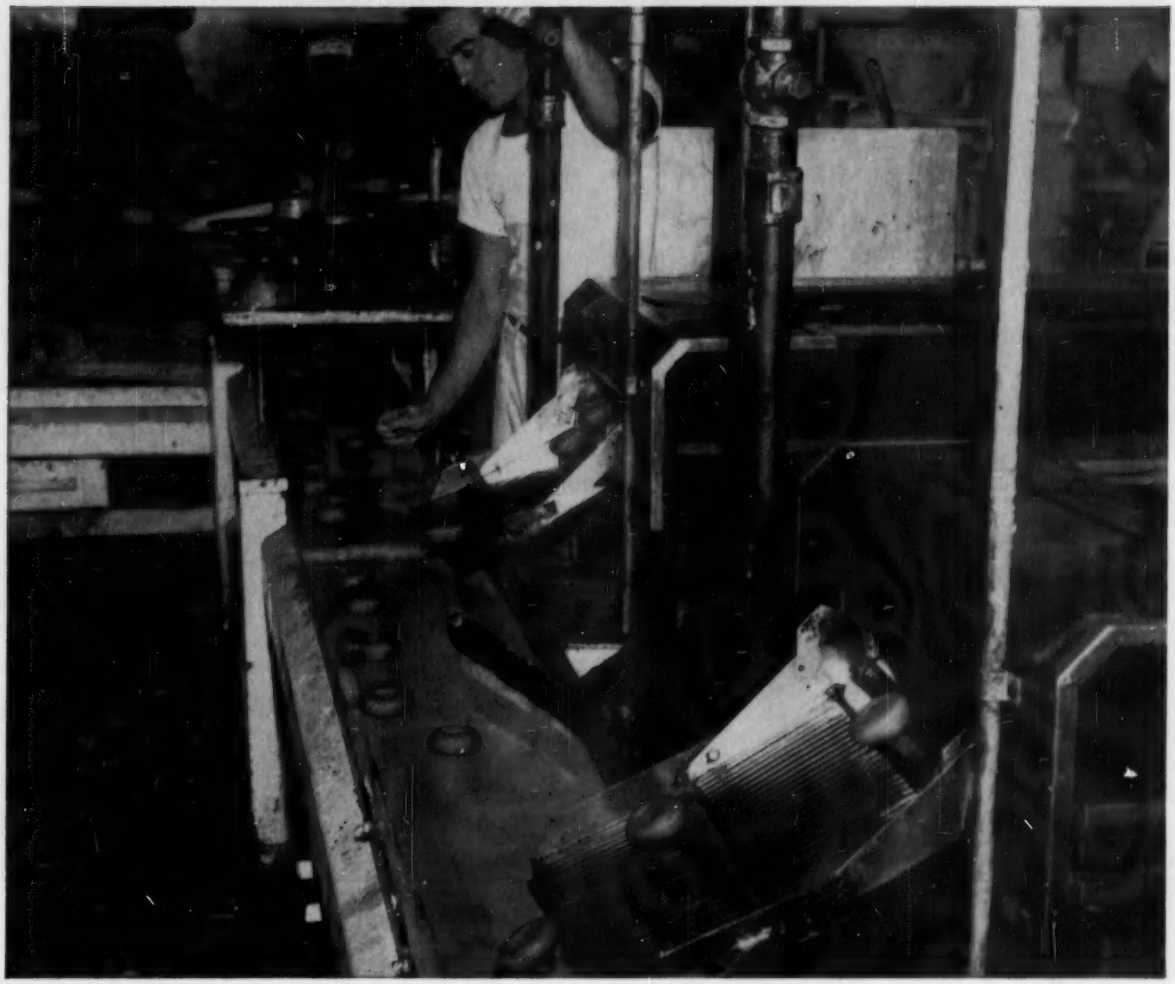
REDUCE SPEED

**RELIANCE ELECTRIC AND ENGINEERING CO.**

CLEVELAND 10, OHIO · OFFICES IN PRINCIPAL CITIES

Canadian Division: Welland, Ontario

# B.F.Goodrich



# Out of the hot fryer and on to easy-to-clean Koroseal belt

***B. F. Goodrich belt has no odor, no taste, never gets rancid***

AT THIS bakery, fresh doughnuts used to be carried from fryer to packing tables on a woven cotton belt. But cooking oil clinging to the doughnuts stained the belt, made it impossible to keep clean. Some belts would last six months, others only three.

Then the Koroseal belt in the picture was tried. Because it's made of Koroseal flexible material, this B.F.Goodrich belt stands cooking oils, animal fats, most acids—and it stands hard use, and just about everything else that ruins most belts.

Food particles can't grind into Koroseal's smooth, polished surface. That's why this belt is such a cinch to clean. Just a quick wipe with a damp cloth and detergent, and the Koroseal belt is as clean and new looking as ever. And since Koroseal, is waterproof, the belt never gets damp or soggy, and so can be used right after washing.

Koroseal resists cracking and peeling, never gets soft or sticky. And, of course, there's no danger of contamination with Koroseal—it has no odor, no taste, never gets rancid. The Koroseal belt shown here has been in service over a year now, and the bakery superintendent says it is in excellent shape.

Get in touch with a B. F. Goodrich distributor and let him tell you more about the line of belts developed by B. F. Goodrich for the food industry. *B. F. Goodrich Industrial Products Company, Dept. M-800, Akron 18, Ohio.*

Koroseal—T.M. Reg. U.S. Pat. Off.

**B.F.Goodrich**

**INDUSTRIAL PRODUCTS**



For more data, circle this page number on card at back →

Rigid temperature control by Worthington equipment helps maintain high quality standards for Wilson & Co.

# Wilson & Co. achieves constant cool temperatures with Worthington Y Ammonia compressor

**At the Wilson & Co.** packing house in Kansas City, Worthington refrigeration equipment plays an important part in the expert processing of well over 1,000 cattle and hogs per day.

**Wilson stresses** heavy duty dependability in their refrigeration requirements. That's where the rugged design of the Worthington Y Compressor pays off. It's designed for continuous trouble-free operation so necessary in meat processing plants.

**A Worthington Y Ammonia Compressor,** similar to the 155 ton unit shown here, can give you extra dividends too, by saving on costly foundations and valuable floor space. The vertical arrangement saves space, and a flange mounted motor may be used, thus eliminating the need for a separate motor foundation.

**An outstanding feature** of the Y Compressor is the Worthington Feather* Valve. It is the lightest, simplest, and most efficient valve ever developed for refrigeration compressor work. Valve strips open and close with a gentle rolling motion—there is no destructive impact. Valve action is extremely sharp with a perfect responsiveness to flow.

**Three heavy duty double-roller main bearings,** supported by the main frame, assure you of permanent alignment and overall rigidity. There are no motor alignment problems.

**All materials** which conform to Worthington high standards are used in construction of the Y Compressor. You can be sure the Worthington Y Compressor will serve you dependably and efficiently.

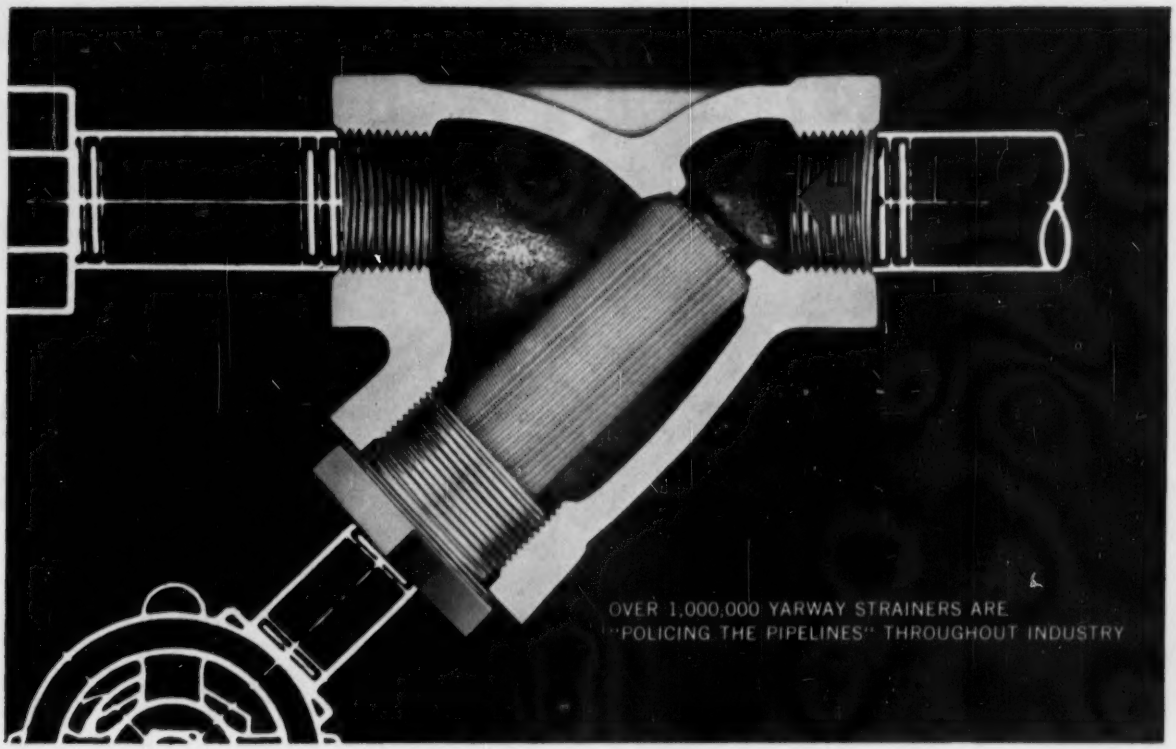
For details, write: Worthington Corporation, Air Conditioning and Refrigeration Division, Section A.6.120-FE, Harrison, New Jersey.

**Your refrigeration problems** can best be solved with a Worthington Y Ammonia Compressor. Available in single or two stage. Capacities: 60 to 460 tons.

*Reg. U. S. Pat. Off.

**WORTHINGTON**

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME




# It's GOOD ENGINEERING to install YARWAY STRAINERS

It's good pipeline engineering to install strainers that are well-engineered—Yarways.

Yarway Fine Screen Strainers protect equipment, prevent dirt, scale, chips, welding dross, etc. from reaching working parts.

Yarway Strainers feature Dutch weave Monel woven wire screens with high mechanical strength and extra fine straining service. Perforated screens in Monel, stainless steel or brass are also available for certain services.

Screen is easily removed for cleaning. Unscrew screen cap and screen comes out with it. When replacing screen, straight threads assure correct alignment, no distortion of screen.

Yarway Strainers are made in iron or steel with rust-resistant finish—also in bronze, stainless steel or aluminum. 10 standard sizes from ½" to 3". Larger sizes to order. Nearly 300 Industrial Distributors stock and sell Yarway Strainers. For the name of the one nearest you, and Yarway Strainer Bulletin S-204, write

**YARNALL-WARING COMPANY**
127 Mermaid Avenue, Philadelphia 18, Penna.

YARWAY
Standard Yarway Strainer, screwed connections
Flanged Yarway Strainer with 2-bolt blow-off cover
Flanged Yarway Strainer with 4-bolt blow-off cover
Dutch-weave Monel woven wire screen
Perforated Screen

**YARWAY FINE SCREEN STRAINERS**



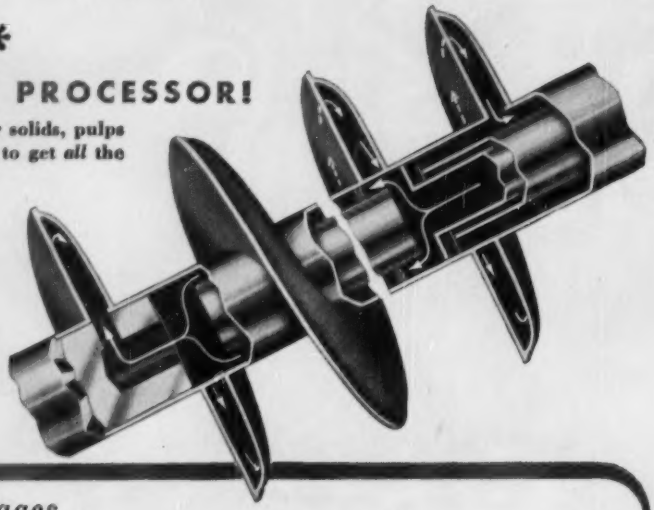
For more data, circle this page number on card at back →

# if you have a Cooling...Heating...or Drying problem

*investigate the revolutionary advantages of...*

## THE holo-flite* PROCESSOR!

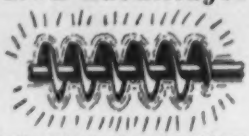
**If you have processes where slurries, granular solids, pulps or pastes are cooled, heated or dried, be sure to get *all* the facts on HOLO-FLITE advantages.**



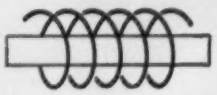
HOLO-FLITE handles such processes — *in continuous flow* — in as little as 1/5th the space of other types of heat exchangers. What's more, it is readily adaptable to a wide range of applications — is simple to install and maintain — and provides many other important savings.

## *typical* HOLO-FLITE *advantages...*

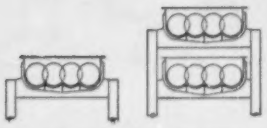
**ITS APPLICATION FLEXIBILITY** is almost unlimited. It cools, heats, or dries. It handles granular solids, pulps, pastes, slurries and fluids with equal ease. Its heat transfer agent can be water, refrigerant, hot oil, Dowtherm, steam or other liquids or vapors at any of a wide range of temperatures. It cools materials in ranges from 1800°F to 0°F. It heats and dries with hot oil to 600°F...with Dowtherm to 750°F...with steam to 150 lbs. per sq. in. pressure.



**THE LARGE HEAT-TRANSFER SURFACE** saves space — HOLO-FLITE requires as little as 1/5th the space of other heat-exchange equipment of comparable capacity. Moreover, a more complete heat transfer is effected, resulting in more uniform processing.

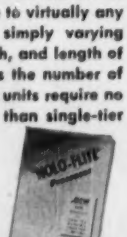


**ROTATION IS SLOW** — granular and powdered solids are handled with practically no dusting — negligible abrasion. There are no dust recovery problems — a further saving in installation, maintenance and operating costs!



**ITS OPERATING CAPACITY** is readily adaptable to virtually any requirements by simply varying the diameter, pitch, and length of flights, as well as the number of "tiers." Multi-tier units require no more floor space than single-tier installations!

*Send for a Free 8 Page Bulletin* which gives further time, space and money-saving details on Holo-Flite installation and operating advantages!




*T.M. Reg. (HOLO-FLITE)

## HOW HOLO-FLITE WORKS...

Basically the HOLO-FLITE consists of one or more flights of hollow-bladed screw conveyors. The product to be processed moves through a trough housing the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums — *as the product is continuously moved along in a bulk-flow without interruptions!*

**There are many money and time-saving applications for the Holo-Flite wherever products are cooled, dried, heated or even calcined. Let our engineers study your *particular* problem and make helpful recommendations. No obligation, of course!**

COTTRELL Electrical Precipitators
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HOLO-FLITE Processors

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Take a
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problem
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ke a look at this big customer. As one of about 30,000,000 rweight in this country, she's trying to do something about her blem. She's watching her weight, and she's shopping carefully. *her a* SUCARYL-*sweetened line*. There are several good reasons y it should be SUCARYL. Number one, of course, SUCARYL has calories. Number two: There's at least a 50-50 chance she's ng SUCARYL right now in her home. And if she isn't, she's read ut it in national ads. So, she's half-way to being sold the minute sees SUCARYL on the label.

ally, SUCARYL hasn't that metallic taste common to other type -caloric sweeteners. You can offer her a product every bit as d and sweet as a sugar-sweetened product, *without* sugar's ories. She'll buy, keep buying—and probably tell her friends ut it.

nk about it. Then give us a call. And if you'd like, we'll send a free SUCARYL sample to experiment with. Just tell us whether prefer SUCARYL Sodium or SUCARYL Calcium. You reach us Chemical Sales Division, Abbott oratories, North Chicago, Ill.

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# Sucaryl®

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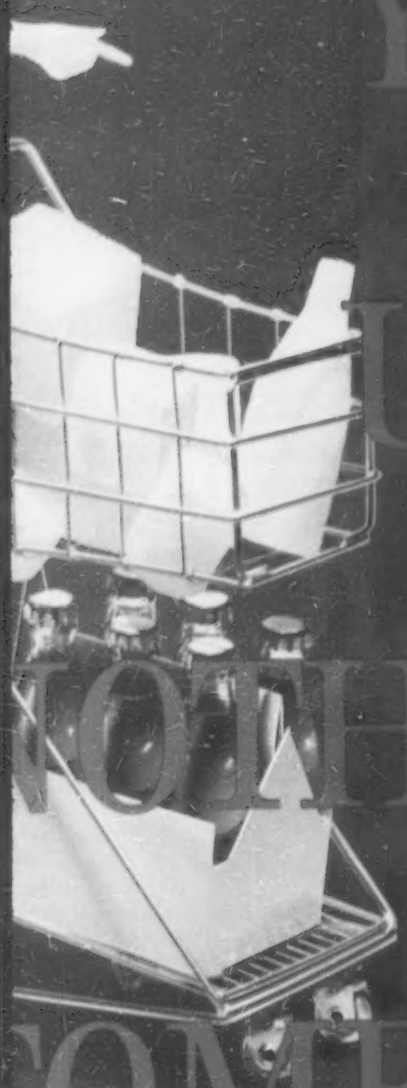
COULD YOU USE TOMER TOMER?



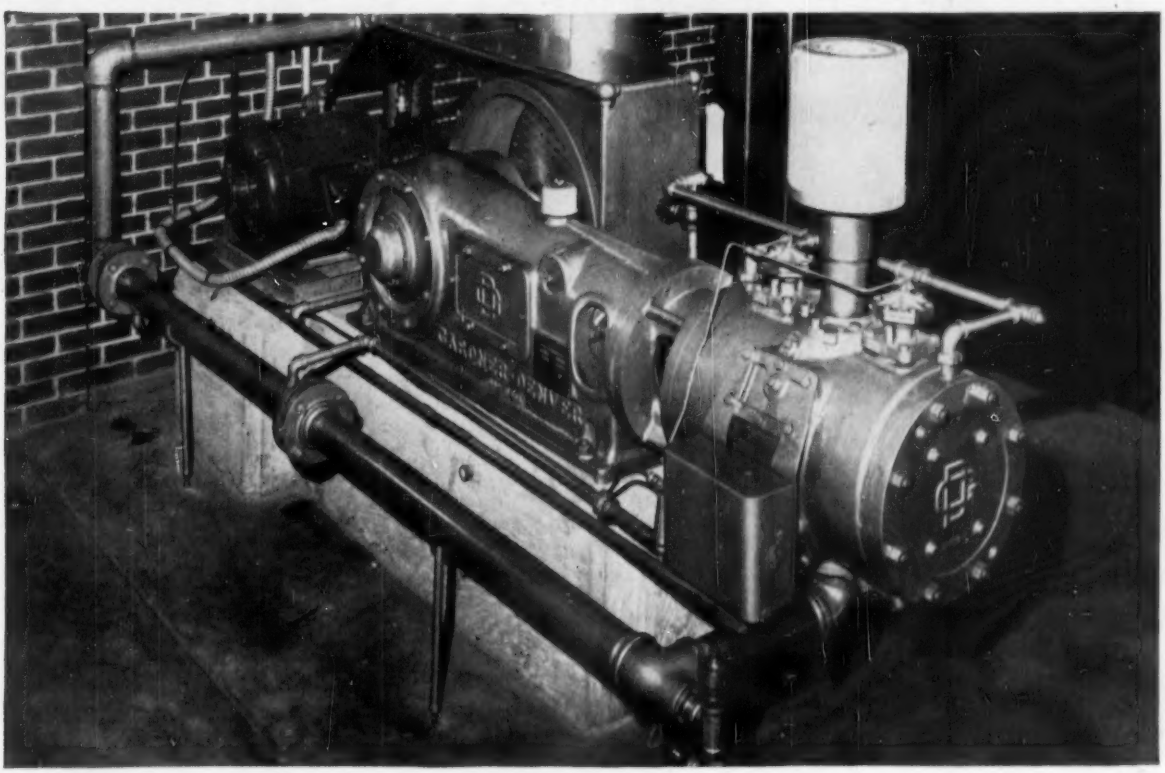
*Whether you're a*

bottler . . .

canner . . .

ice cream manufacturer . . .

**Gardner-Denver . . .** Serving the World's Basic Industries



# Oil-Free air with no maintenance penalty . . . Gardner-Denver Carbon Piston Compressors

Pure, oil-free air that's safe for textiles, plastics, foods, beverages, automation instruments. Low-cost air that's economical for maintenance tools and regular plant operation.

You get *both* from the Gardner-Denver CRX Carbon Piston Compressor.

Self-lubricating carbon, used for pistons and other parts, does away with any need for oil in the cylinder. Yet, user reports show that cost per cubic foot of air compressed by the CRX matches usual compressed air costs. There's no maintenance penalty—no need for two separate compressed air systems in your plant. Send for Bulletin CRC-10 today.

**A Tip For Breweries**
With this set-up, one man can remove beer barrel bungs at the rate of 400 per hour. It's done with a poppet controlled Keller Tool "Airfeedrill".® Write for details.

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# MERCK INGREDIENTS IMPROVE FOOD PRODUCTS

Here's a golden opportunity for some manufacturer. Peanut butter is a natural for vitamin A fortification. This popular spread lacks vitamin A, but recent tests show that the vitamin can be easily incorporated—with existing equipment.

People rely on fruit and vegetable juices for their vitamin C. Unfortunately, the natural products are highly variable in C content. You can make definite label claims for your juices by standardizing vitamin C content with Merck Ascorbic Acid.

Nutrition-minded Americans rely on modern macaroni products for substantial amounts of food energy. More recently, manufacturers are noting increased consumer acceptance for macaroni enriched with Merck Vitamin Products. Enrichment packs a potent point-of-sale appeal.

With millions of people watching their calories, Merck Calcium Cyclamate—a non-caloric sweetening agent—is a valuable ingredient in a variety of dietetic foods and beverages. It is stable in baking, boiling, and freezing processes, and is compatible with all of the usual flavors.

*Research and Production for the Nation's Health*

MERCK & CO., INC.
CHEMICAL DIVISION
RAHWAY, NEW JERSEY



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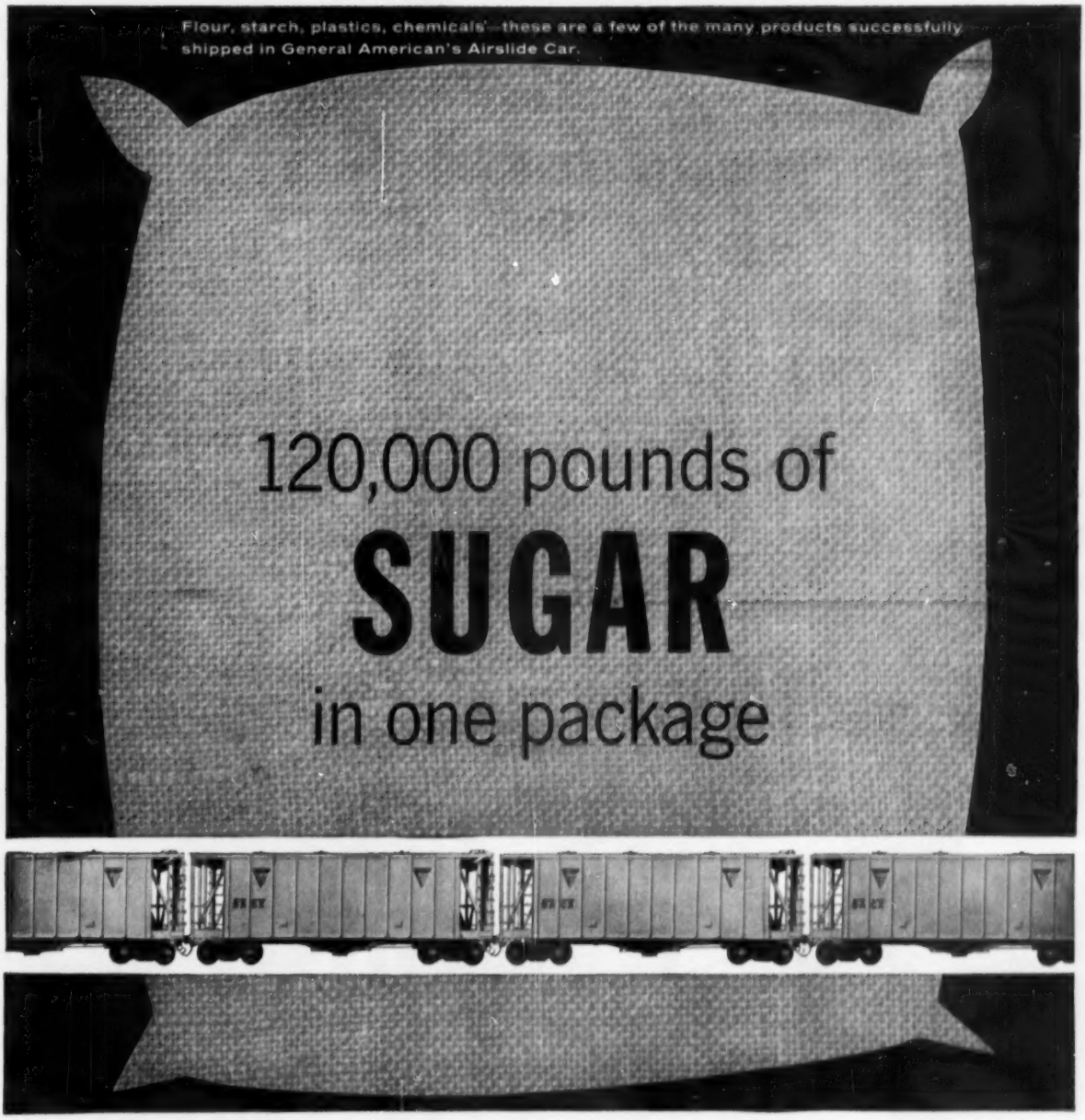
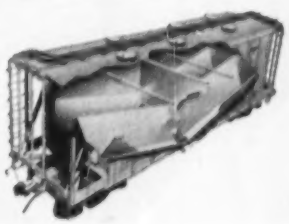

Flour, starch, plastics, chemicals'—these are a few of the many products successfully shipped in General American's Airslide Car.
120,000 pounds of
SUGAR
in one package

## Save! Ship sugar in bulk via Airslide® cars

Sugar is now being successfully shipped in Airslide Cars under all climatic conditions from one part of the country to another. Over 2000 Airslide cars are now in use or on order. They require no re-spotting, provide far more clearance for unloading and can be unloaded into any conveying system as fast as the system permits. If such requirements are important to you, write today for full information about General American's new Airslide car.

**CLEAN INTERIOR DESIGN.** *All-welded construction provides maximum sanitation and minimum product retention. All hatches and outlets provide a hermetic seal, assuring complete in-transit protection.*



AIRSLIDE GENERAL AMERICAN TRADE MARK

**GENERAL AMERICAN TRANSPORTATION CORPORATION**
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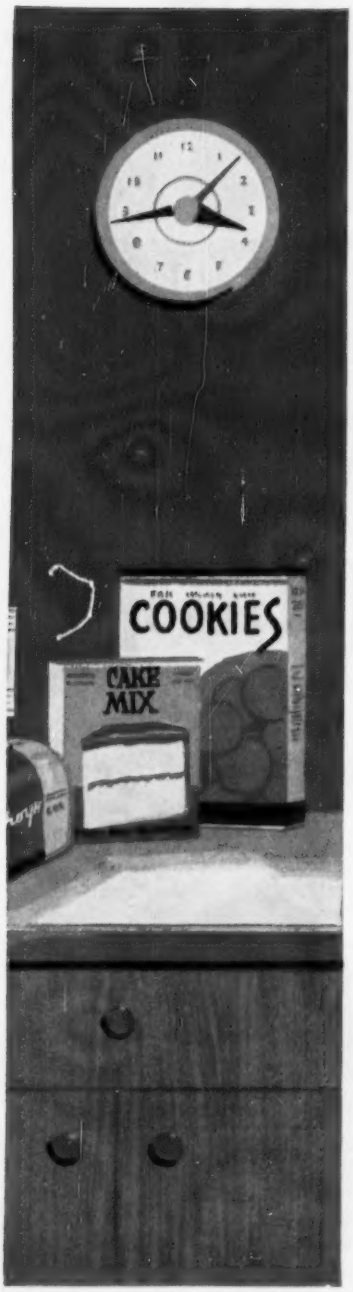
# Your product is in the bag.

# ...with ATLAS food ingredients




## Use Atlas sorbitol and emulsifiers for better taste, texture, keeping qualities...

### *put your product on more shopping lists*

**BREAD** made with ATMUL® emulsifiers has improved texture, keeps soft and fresh-tasting longer. These are the emulsifiers with "optimum balance" of monoglycerides and diglycerides for exceptional results.

**ICE CREAM** made with ATMOS® emulsifiers is superior in dryness, body, texture . . . requires less time for whipping and overrun. High mono content assures good emulsification of the ingredients in the mix.

**SOFT DRINKS** of the low calorie variety have improved "mouth feel" and new taste appeal when Atlas sorbitol is added for flavor dispersion and bodying purposes.

**SORBITOL**—A superior conditioner and a wholesome food ingredient, helps retain the tender texture and softness of foods containing sugar. Mildly sweet, sorbitol blends well with other ingredients.

**ATMUL and ATMOS emulsifiers** provide a unique combination of high monoglyceride content and diglyceride bonus. They're made in the world's largest food emulsifier plant to the highest standards of purity and uniformity.

We'll be glad to show you how your product can gain the outstanding advantages of Atlas ingredients. Write for samples and suggestions.

FOOD INDUSTRY DEPARTMENT

ATLAS

CHEMICALS DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

ATLAS POWDER CO., CANADA, LTD.
BRANTFORD, ONTARIO, CANADA



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Polyethylene packaging for Hardies' candy is supplied by **Milprint, Inc.,** Milwaukee, Wisc.

# "The consumer definitely prefers *polyethylene-packed candy*"

That's the verdict of Donald M. Hardies, president, Hardies, Inc., Butler, Pa., after more than a year's profitable experience packaging candy in film made of BAKELITE Brand Polyethylene.

"We made the switch to polyethylene at the insistence of our customers—mainly super markets. These stores said that candy in polyethylene sold much faster than in any other package.

"From a manufacturing standpoint as well as retailing we like these bags because there is much less spoilage. Candy doesn't dry out. The heat-sealing is easier and the polyethylene bags have a much longer shelf life than former packages."

If you make or sell candy, you should make sure you're getting these advantages of packaging in film made of BAKELITE Polyethylene. Consult your packaging supplier, or for our "Candy Packaging" booklet, write Dept. RV-63.

***It pays to package in film made of***

**BAKELITE**
BRAND
Polyethylene Plastic

**BAKELITE COMPANY,** *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

**use steam efficiently, economically—choose the trap with . . .**

# just one moving part

## . . . for easy maintenance

After all, a steam trap *should* be simple. Its job of discharging condensate and air from steam lines and equipment, is a simple one. But its importance shouldn't be overlooked. On its effectiveness can rest your economical use of steam . . . the efficiency of your process operations.

With Nicholson steam traps there's just one moving part. Nothing to go wrong. But with all their simplicity, Nicholson traps have the greatest capacity of any trap their size. Plenty of other important features, too, and it'll be well worth your while to check them.

- **Powerful valve action**
- **Tight, positive shutoff**
- **No dribbling, no steam waste**
- **Each unit service tested**

Specify Nicholson, and be sure.

Write today for new Bulletin 10-55

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W. H. NICHOLSON and Company

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LAUNDRY, DRY CLEANING AND PRESSING MACHINERY

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# WHY SHOULD THE VITAMIN C CONTENT OF FRUIT AND VEGETABLE JUICES BE STANDARDIZED?

*Because nutrition reports disclose that—*

- **Vitamin C deficiencies exist throughout the country***
- **Scurvy has not disappeared from the United States***

**Proof of deficiencies among adults and children.** You should know these facts!* Diet surveys from Maine and Vermont, New York, Illinois, New Mexico, Oregon, West Virginia, and Texas show a definite pattern of inadequate vitamin C intake. These studies covered grade school and high school children, college men and women.

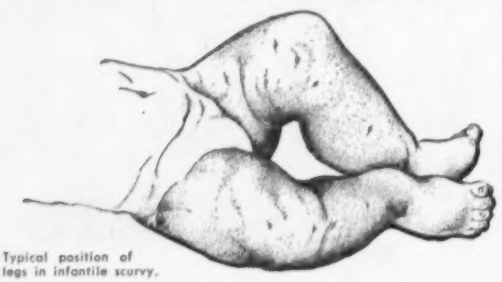
Spongy, swollen gums symptomatic of scurvy.

From these studies* of dietary habits and physical conditions there is considerable proof that many of the children and adults covered by survey have actual, physical symptoms of vitamin C deficiency.

**Infantile scurvy.** Scurvy* occurs, even today, among infants who are artificially fed. Fortunately the disease may be cured by the administration of vitamin C. How much more sensible it is to prevent it by supplying these bottle-fed infants with the daily allowance of 30 milligrams of vitamin C as recommended by the Food and Nutrition Board of the National Research Council for children under one year of age.

Symptoms of infantile scurvy are fretfulness and fear of being touched.

These bottle-fed infants, unless receiving a pediatric prescription containing vitamin C, are largely dependent on supplemental ascorbic acid which they receive from fruit or vegetable juices. Unless fortified with vitamin C many of the processed juices may not supply these babies with adequate quantities of this essential element.



Typical position of legs in infantile scurvy.

**What can be done?** Because of the increasing evidence that American diets are deficient in vitamin C, leading nutrition experts believe that processed fruit and vegetable juices, on which the public is so reliant for its supply of this necessary vitamin, should contain the "Vital Ingredient."

The Vital Ingredient of any processed fruit or vegetable juice is a *dependable* and *adequate* supply of vitamin C. You can give your juice this ingredient by *standardizing its vitamin C content*. The processing is simple and the new low cost of ascorbic acid makes juice standardization more attractive than ever.

With ascorbic acid available *by the tons* at extremely modest cost fruit and vegetable juices can have a standardized vitamin C content for the better protection of the nation's health and well-being.

*Statements are based on documented reports. References on request.

Illustrations after photographs in The Vitamins in Medicine by Bicknell and Prescott, Third Edition, published by Grune & Stratton, Inc., New York.

**ROCHE** Pure, crystalline VITAMIN C
(Ascorbic acid, U. S. P.)

VITAMIN DIVISION • **HOFFMANN-LA ROCHE INC.** • NUTLEY 10, N. J.

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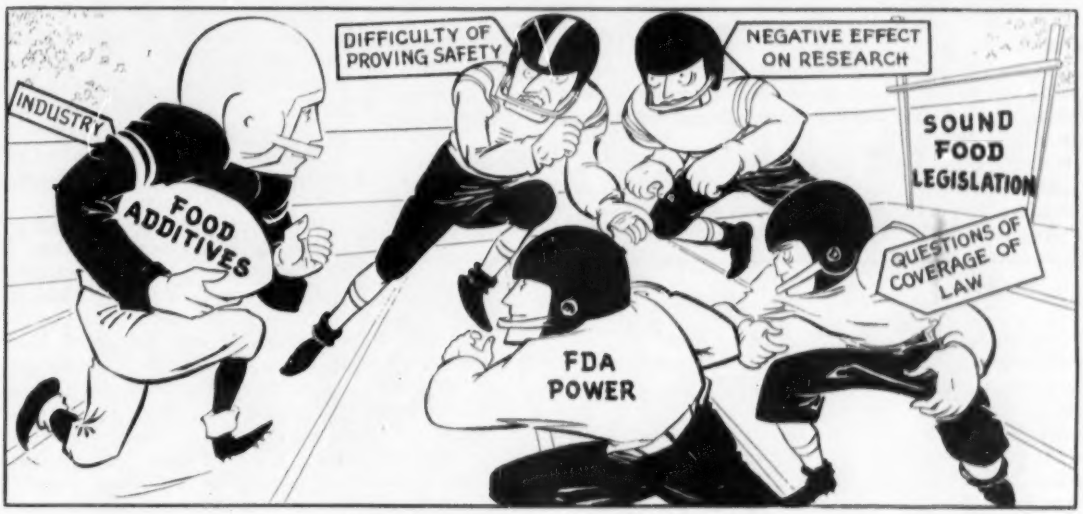



. . . Last down in crucial Food Bowl "game"

*Here's A Sharp Closeup of the*

# FOOD ADDITIVE SCRIMMAGE

**JOHN A. GOSNELL**
Hawes & Gosnell, Law Offices,
Washington, D. C.

**Aim: To help you pierce the welter of unresolved questions—particularly the knotty contention of whether the courts should, or should not, review additive decisions**

IT IS NOT OFTEN that an industry submits to Congress a legislative proposal which imposes on that industry a considerable degree of regulatory control, with its attendant burdens of expense and trouble.

Rarer still is the government agency that objects to enlargement of its powers and states that it prefers no legislation to that merely aimed to remedy claimed procedural inadequacies.

**Yet this somewhat unique circumstance did occur during the 1956 hearings on the food additive bills before the Health & Science Subcommittee of the House Interstate Foreign Commerce Committee, which did not see fit to report out a bill.**

True, the proposed food additive controls were aimed at protection of the public health, yet the government rejection of the industry proposals, the failure of the Committee to report out a bill, and the lack of evidence produced by the protracted Delaney Hearings (1950-1952), testify that the government is exhibiting no impelling urgency in this situation.

This is understandable in light of the demonstrated fact that this nation has the safest, as well as the most abundant, food supply in the world. The industry record for safety is well nigh perfect.

It is also true that the responsible food industry, being equipped with extensive and highly competent research facilities, is, on the basis of experience, extremely unlikely to market any food product that involves even a possibility of adverse effect on the public health. The reasons behind this assertion are both practical and potent.

First is the vital necessity of maintaining an impeccable reputation for quality of product, if only for commercial reasons. Failure to have due regard for the extremely sensitive public reaction to adverse publicity in this respect could be disastrous. Second, and less important, is the very real legal responsibility for safety of its product.

**The fact is, however, that industry favors a reasonable degree of federal control over new food additives. FDA, as is well known, has been advocating control legislation for several years, and it is incumbent upon industry to guide the development of such legislation along sensible lines to the extent possible.**

It is frankly admitted in some quarters that submission to control legislation is based in part on inability to cope with the arbitrary in-

## Your Part Toward Achieving A Sound Additive Policy

**Much argument and needless conflict has resulted from a failure to recognize the great opportunity—as well as the few needed precautions—in developing chemical additives for foods.**

**► Hence this special article—to clarify the problem and to define the pitfalls and blockades to which industry men may fall victim in either a careless or overzealous approach. Bureaucratic tyranny, though not really expected, could be one of those dangers.**

**► Hardly a member of the food industry can afford to neglect this broad subject. Accordingly, the points made by Author Gosnell will help you to understand its complexities and to support sound progress, all with full assurance of protection for the public health.—The Editors**

formal ruling that FDA apologetically blames on section 406 (a) of the present law. These rulings, under a tenuous interpretation, are based on what has come to be known as the *per se* doctrine, which is presumed to prohibit any trace of a toxic material in food, regardless of whether any actual hazard to health is present.

**Significantly, FDA has recently announced a willingness to abandon this concept if new and satisfactory control legislation is passed.**

### 6 Aspects That Create Concern

It is safe to say that everyone primarily affected by the proposed legislation is very keenly aware of the pitfalls. The major areas of concern are: (1) Extent of coverage of the law, (2) practical impossibility of proving either adequacy of testing or safety, (3) possible government domination of food improvement policy, (4) potential negative effect on research and development, (5) expense to industry and the public, and (6) the practical difficulty of reversing an administrative decision.

Add to these the fact that the matter of food safety is a subject highly susceptible to personal opinion, emotion, prejudice, and even competitive influences, and the solid basis of industry concern comes clearly into focus.

Much industry criticism has been directed to the fact that, under the proposed bills, the law would apply to any new food additive "not generally recognized" as safe among scientific experts qualified in the food field.

This loose language is an expedient formula designed to relieve the government of the difficult burden of proving that a given substance may be injurious to health. Also, this general-recognition test is subject to serious technical legal defects, particularly since this ambiguous phrase serves to invoke the jurisdiction of a law involving criminal penalties.

Further, this legislation is aimed at new substances that present a reasonable probability of injury to health, and the jurisdictional clause should be couched in precisely these terms. To ease the burden of proof on the government to establish jurisdiction in the first instance, the act could authorize the administrator to rely on expert opinion in determining whether a reasonable probability of injury to health does exist. This at least gives a defendant some chance of contesting the application of the law.

On the other hand, the general-recognition test, in addition to its legal weaknesses, has the tricky effect of throwing everything under the law that the government does not admit to be generally recognized as safe.

Industry is also justly concerned as to the status of materials in use. With the exception of those it has already informally approved, FDA seeks to have the law require pretesting of all materials that are now in use but that have not previously been subjected to adequate safety testing. Presumably, the government would decide what has not been adequately tested, regardless of the period of use without evidence of harm, and without any showing as to the probability of injury.

**The failure of the government to recognize past negative-effect use by man as valid evidence of safety, has been criticized, because this proof through use can never be approached by laboratory methods.**

**Some important segments of industry, therefore, will probably insist on a definition that will protect against arbitrary, random pre-testing requirements before continued use, unless there is some showing of adverse effect.**

Under the proposed legislation, industry would have the two burdens of proving that a new substance has been adequately tested, and that it is safe for the use proposed. But both of these burdens are bottomless pits unless the government authority is limited to a practical standard of safety. Absolute safety is, of course, neither realistic nor attainable.

**Industry, therefore, has insisted on relating safety to the intended use.**

Without such restriction the government would have an absolute veto in that the expense of the experimentation required could force abandonment of even a proper and meritorious new product. This is reported to be happening in the case of pesticides where, under the Miller Act, the cost of research imposed by the government has forced industry to abandon plans to market some promising products.

The industry complains here of the unreality of the research imposed, particularly with respect to residue levels. It contends that much of the experimentation required has little or no relation to actual hazard to public health.

This is a significant development, and the pesticide industry now finds itself faced with a very serious problem. And there is no reason for the food industry to expect any different treatment on additives. In fact the enforcement policy is likely to be more strict with respect to food components.

### Lukewarm on Committee Approach

Mention should be made here of the scientific advisory committee as a device to assure some measure of balance with respect to administrative determinations of safety. Although such committees were provided for in the act on pesticides, the food industry appears to be unenthusiastic about their use.

FDA has said that such committees will be utilized whether or not they are provided for by law. Consequently, some industry representatives are coming to the conclusion that if such committees are to be used anyway, it may be desirable to have their reports included in the record and the authors of such reports made available for cross examination.

Some recent support has appeared

(*Turn to page 160*)

**THIS BIRD'S FRESHNESS** is protected by the new FDA-approved oxytetracycline preparation, thus it now has up to twice the keeping time of conventionally refrigerated poultry. Application is simple, the soluble agent being added to the slush tank during processing. Note wing-clip label stating "Oxytetracycline added to retard spoilage." This meets FDA requirements.

# How Newly OK'd Antibiotic Boosts Poultry Shelf-Life

**Chilled in an ice bath containing special oxytetracycline product, birds will stay fresh up to 100% longer. Furthermore, tests show that this agent can also up shelf-life of other perishables—meats, fish, vegetables**

**C. L. WRENSHALL and J. R. McMAHAN**

Respectively, Associate Director and Development Biochemist, Technical Service Department, Chas. Pfizer & Co., Brooklyn, N. Y.

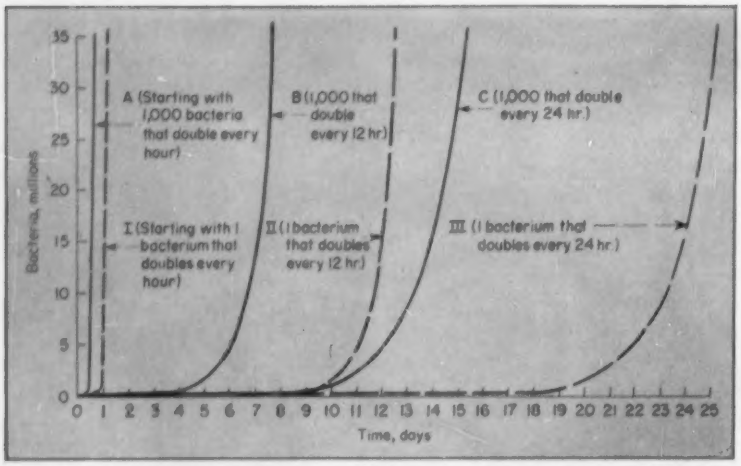
APPROVAL by FDA of a second broad-spectrum antibiotic—oxytetracycline, for poultry processing—emphasizes the tremendous potential of these agents in delaying bacterial spoilage of perishable foods.*

The new material, designed to extend freshness time of poultry 50-100%, is being immediately offered to processors by our organization, Chas. Pfizer & Co., in a special formulation containing 20% oxytetracycline plus citric acid. We call this product Biostat-PA.

**However, let it be clearly understood that use of antibiotics will not in any way lessen the need for proper plant sanitation, or good processing and distribution methods. Furthermore, they are of no use in concealing spoilage that has already occurred, or in reclaiming foods that are heavily contaminated. Also refrigeration is still essential for maximum success in the performance of this agent.**

Of further interest to all proces-

*Re new approval, see FE Nov., p. 196. Re first-sanctioned agent (Chlortetracycline, cleared a year ago and also limited in the U.S. to use in and on uncooked poultry), see FE Jan., p. 43).


A (Starting with 1,000 bacteria that double every hour)
B (1,000 that double every 12 hr)
C (1,000 that double every 24 hr.)
I (Starting with 1 bacterium that doubles every hour)
II (1 bacterium that doubles every 12 hr)
III (1 bacterium that doubles every 24 hr.)
Bacteria, millions
Time, days

**BACTERIAL-POPULATION "EXPLOSIONS"** quickly limit a food's shelf-life, as depicted by these curves. Curve A traces population increase on a product initially having 1,000 bacteria that double every hour. Curves B and C show magnitude of effect when bacteria double every 12 and 24 hr., respectively. Curves I, II, and III give similar data for foods with initial load of 1 bacterium. Steep climb of these curves indicates the advantages of limiting the initial load of bacteria and slowing their rate of doubling. Food's shelf-life is the time interval before bacterial counts start to rise sharply.

**sors, there is strong laboratory evidence attesting the effectiveness of this antibiotic in prolonging the shelf-life of other perishables, including meats, fish, shellfish, and fresh vegetables.**

As for marketing of Biostat-PA, we are initially using a 2-kg. (4.4 lb.) metal can with polyethylene liner. This packaging is designed for maximum protection against moisture pickup in transit or storage. For convenience in measuring out the product, a 17g. scoop is included.

#### Economic Factors

Marketing data indicate that thousands of tons of food could be saved annually by proper use of antibiotics—a major potential saving to producers, processors, and consumers alike.

For example, losses in fruits and vegetables alone amount to over a billion dollars a year. Of some 100,000 carloads of vegetables shipped from Florida to New York in 1952-53, the equivalent of 4,000 carloads was discarded as spoiled on receipt—for a loss of nearly $5 million.

USDA reports that all marketing losses for poultry (including spoilage) run to 9.7% of the total value of poultry products, or $268 million a year. Presumably, comparable losses occur in other livestock products, which have a total annual value of almost $16 billion.

In addition to this economic loss, the consumer must tolerate some degree of deterioration in present foods. However, experience at the processing level shows that this marginal loss of freshness can be cut by proper use of antibiotics.

#### Causes of This Spoilage

In general, foods are attacked by three different agents—bacteria, fungi (yeasts and molds), and enzymes. True, not all food spoilage is caused by bacteria. But a major proportion of it is. And in this area, antibiotics are of overwhelming importance in controlling losses as well as health hazards.

Under natural conditions, some perishable foods have extremely short shelf lives, sometimes only a matter of hours. Bacteria on or in them multiply immediately. Then suddenly, the bacterial count goes into a steep climb (see graph)—a "population explosion" that quickly spoils foods.

There are two methods by which food freshness can be extended. One is to cut the initial population of bacteria that are capable of reproducing. The other is to slow down the average rate of growth. Antibiotics and refrigeration appear to act in both ways.

Under refrigeration, only those bacteria tolerant of cold can grow. And in the presence of a broad-range antibiotic, only a few of the bacteria present are able to grow at all, and then only at reduced rates. Thus, the two methods supplement each other. Advantages to be gained by using antibiotics are greatly increased when they are used in combination with refrigeration. Importance of good sanitation is obvious, since it limits the bacterial population to begin with.

#### Poultry Application

These relationships are confirmed by tests run with Biostat-PA, which is added to chill tanks during the processing of ice-chilled whole poultry. There is an important correlation between the temperature of the bird's body cavity and the extension of freshness. The closer the body-cavity temperature is brought to 34F., the longer is freshness prolonged.

**Therefore, it is extremely important that poultry thus processed remain in the iced chill tank for no less than ½ hr., and preferably up to 2 hr.**

Here is the 6-point procedure for using the material:

1. Fill the chill tank at least ¼ full with water (containing some ice, if desired).

2. Add the proper amount of antibiotic mix, and stir until dissolved. One 17g. scoop is used for each 90 gal. of tank capacity. If more convenient, material may be dissolved separately in a small amount of water, which is then added to the tank.

3. Add the eviscerated poultry, cover with crushed ice, then connect air hose, and acrate tank.

4. Leave poultry in tank until body-cavity temperature reaches 34F, (usually 1-2 hr.).

5. Drain off the solution, and discard.

6. Remove poultry, drain, and pack in usual manner. Do not wash birds, since this will remove some of the antibiotic, which should be retained to continue its antibacterial action.

If in-plant chlorination is employed, dissolve the antibiotic in about 1 gal. of drinking water, and pour into chilling tank after about half the total number of birds have been added. Then proceed as above.

This material is readily soluble in water, thus a stock solution for

a day's run may easily be prepared. If this is desired, dissolve 680g. in water and dilute to 10 gal. Use 1 qt. of this solution per 90 gal. of chill-tank capacity. Stock solutions should be used within a 24 hr. period.

At present prices, cost of the formulation is 0.42-0.47c. per lb. of poultry processed.

Giblets usually are treated along with the birds in the chill tank. They are placed in a parchment wrapping which is then inserted into the bird's body cavity. Or they may be handled separately by being chilled in a 10-ppm. solution (with added ice) for 15 min., then packed with the birds as usual.

Principal use of oxytetracycline is in retarding spoilage of whole birds. In conventional practice, processors who prepare and package poultry parts remove birds from the chill tank and send them to the processing line for cutting. These newly exposed surfaces are not adequately protected against spoilage under the presently recommended chill-tank dipping method.

Therefore, when these birds are packaged and shipped, they might keep only 1-2 days longer than untreated poultry. We are developing techniques to solve this problem, but present data are incomplete.

#### Federal Regulations

FDA has established a tolerance of 7 ppm. for residues of oxytetracycline in or on uncooked poultry. With respect to residues, oxytetracycline is unstable at cooking temperatures. Residues in poultry as eaten, are undetectable.

However, poultry treated with this antibiotic must bear labeling stating that fact. An acceptable statement to comply is: "Oxytetracycline added to retard spoilage."

### Meat, Fish, and Vegetable Uses Seen

Since FDA has not yet established tolerance levels for the use of antibiotics in foods other than poultry, the following discussion is intended only to outline possibilities for future use of oxytetracycline. Numerous researches indicate effectiveness of this agent as a spoilage inhibitor in a variety of foods:

**1. Meats:** Use of oxytetracycline permits safe "high-temperature" aging of meats.

Tests show that treated carcasses held at 55-60F. for 24-48 hr. before chilling have the flavor and texture of meat aged 7-10 days at 34F. This practice could speed product turnover for packing-house operators.

Whole carcasses can also be treated to prevent deep spoilage by intraperitoneal injection of beef cattle, sheep, and hogs with an oxytetracycline solution before slaughter. The method is simple and entails a minimum amount of operator training.

In addition, carcass sides may be sprayed with antibiotic preparations to control growth of surface microorganisms. This should be done as soon as possible after skinning and before shrouding. After spraying, excessive handling of carcasses should be avoided.

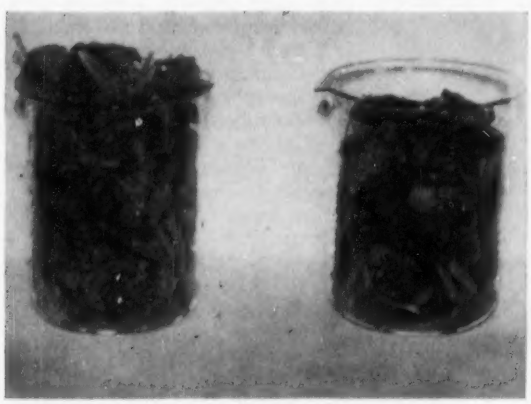
Freshness of comminuted meat products, such as ground beef and fresh pork sausage, can be greatly extended by antibiotic treatment. Adding 3-5 ppm. of oxytetracycline to fresh pork sausage prolongs its fresh life by 50-100%. The antibiotic is also surprisingly effective in maintaining fresh color.

Various cuts of meat (steaks, chops, roasts) can be kept longer when treated with antibiotic solutions by dipping or spraying. Economically, this technique offers the advantage of prepackaging consumer cuts at the processing plant, rather than at the retail level.

**2. Fish and Shellfish:** Here, oxytetracycline formulations may be used in two methods: (1) Packing the fish with ice containing the antibiotic, and (2) dipping or spraying with a dilute solution of the agent.

Fresh life of fish is boosted 80-150% when they are packed in ice containing 5 ppm. of oxytetracycline. Thus treated, red fish (noneviscerated) stay fresh for 20 days, while control samples (packed in regular ice) spoil in 14 days. Had-

### Probe Fish and Vegetable Techniques



**BETTER-KEEPING VEGETABLES** are another possibility, as shown by results of 48-hr. storage test (photo). Antibiotic-treated spinach is at left, control is on right. Both samples were stored at 88F., 80% R. H.

**FRESHNESS** of seafood can be greatly extended by this antibiotic treatment. Above: Tissue samples of treated codfish are being ground for assay, which provides data for checking the agent's effectiveness.

dock (eviscerated) remains fresh under oxytetracycline ice for 25 days, while control samples last 13.

Dipping cod fillets in 25-ppm. oxytetracycline brine triples their keeping time at 32F.—an extension of shelf life that could revolutionize the distribution of fresh fillets.

Cooked lobster meat, which spoils in about 6 days at 32F., remains fresh for more than a month when given an instantaneous dip in a 150-ppm. oxytetracycline solution. Shucked clams dipped in a 5-ppm. solution and stored at 32F. are fresh for 35 days, while untreated clams spoil within a week.

3. **Fresh Vegetables:** A 15-sec. dip in a 25-ppm. oxytetracycline solution can substantially extend the shelf life of peas, broccoli, lima beans, cauliflower, and spinach.

In our laboratory, we prolonged the refrigerated shelf life of a prepared green-salad mix from 3 to 6 days by rinsing the vegetables with a dilute solution of oxytetracycline. The added protection is attributed to a small residual level of antibiotic activity, which can be detected by assay.

#### Other Applications Explored

In many countries, widespread use of fresh milk is precluded by poor transportation facilities and lack of refrigeration.

Relative to this problem, tests indicate that 1 ppm. of oxytetracycline added to raw milk at the time of milking delays the onset of souring about 1 day at 99F. If the milk is first pasteurized, the antibiotic will preserve it from two days to several weeks, depending on storage conditions and agent concentration.

**Finally, this antibiotic possibly offers advantages in the processing and distribution of frozen foods. It might protect a product in the processing stage prior to freezing. Afterwards, it might delay spoilage of a frozen food during accidental thawing.**

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# Experts See 4-Way Future For Antibiotic Agents

**In revealing symposium, they accent big potential of these spoilage inhibitors in extending freshness of poultry, meats, fish, and vegetables**

**FE STAFF**

LATEST DEVELOPMENTS in the use of broad-spectrum antibiotics were highlighted in the recent Fourth Annual Symposium on Antibiotics held in Washington, D. C.

**Reported were striking extensions of freshness of a variety of perishables—(1) poultry, (2) meats, (3) seafood, and (4) vegetables. Also explored were the complementary actions of irradiation and antibiotics in prolonging the shelf-life of refrigerated, prepackaged red meats.**

Of top interest to processors was the announcement of FDA approval for the use of oxytetracycline in and on uncooked poultry (see preceding article). Formerly, chlortetracycline was the only agent so approved for use with food.

Consensus of the conference was that antibiotics can effectively supplement—but not replace—conventional preservation techniques. Antibiotic effect is greatly increased when these agents are used in conjunction with refrigeration. Moreover, they definitely are not substitutes for proper sanitation and good processing methods.

Here are the specifics:

#### 1—Extends Poultry Freshness

Shelf-life of fresh poultry meat may be upped some 25% by a 15-min. dip in 10-ppm. solutions of either chlortetracycline or oxytetracycline, according to W. J. Stadelman, Poultry Science Dept., Purdue U., Lafayette, Ind.

In addition, 34F. storage significantly extends keeping time (over 41F.) prior to spoilage, which was detected by microscopic examination and off-odor. Holding the chickens in ice for 48 hr. before cutting is more effective in retarding spoilage than cutting them up immediately after cooling, especially with non-antibiotic-treated birds. However, shelf-life of chicken parts dipped in antibiotic solutions is no greater than that of parts from birds dipped prior to cutting up.

Other papers by researchers of American Cyanamid Co.'s Food Industry Dept., Princeton, N. J. dealt with various aspects of the use of chlortetracycline on poultry.

Successful application of this antibiotic to turkeys processed under commercial conditions was reported by H. M. Windlan.

For the past year, he said, chlortetracycline has been used almost entirely on broilers. However, recent tests point up three factors of significance to turkey processors: (a) Birds can be cooled up to 24 hr. in the antibiotic solution and still be within FDA tolerances, (b) properly treated turkeys will stay fresh for 14-21 days, and (c) frozen birds that thaw may retain the keeping qualities of fresh turkeys.

A. R. Kohler declared that chlortetracycline treatment now enables tray-packaging of cut-up poultry at the processing plant. Although this is the most economical place to do the prepackaging, it has been impractical under ordinary operating conditions because of decreased shelf-life of cut-up birds. Now, field experiments indicate that this antibiotic provides an extension of freshness sufficient for centralized tray-packing.

A. Abbey said tests showed that ordinary home-cooking of chickens properly processed with chlortetracycline leaves no significant amount of antibotic.

Birds were treated with 10, 30, and 300 ppm. of the antibotic for periods ranging up to 24 hr. Poultry was cooked by boiling, roasting, broiling, and frying, and was found negative for chlortetracycline in all cases except the 24-hr., 300-ppm. treatment. Here, over 98% of the antibiotic was removed by the cooking.

(Turn to page 179)

# Line-Productivity "Precisioned"

**—by time-output instrument system that achieves new accurate control over both operational and maintenance factors**

**R. O. ROBBINS**
Industrial Methods Engineer, Birds Eye Division, General Foods Corp., Hillsboro, Ore.

PROCESS-LINE BOTTLENECKS are pinpointed, and idle time of equipment and personnel is reduced, by the continuously operating, automatic, time-recorder and totalizer system installed in the plant of the Birds Eye Division, General Foods Corp., Hillsboro, Ore.

Company engineers initially put sets of these instruments on the wrapping machines to obtain line-productivity data. The wrappers were selected because they constituted the line's unit-operation terminus. They thus afforded the key "on"-and-"off" time checks to "yardstick" the efficiency of the line operation.

Today, after more than two years of operation, chronological operation data have been accumulated to provide:

**1. A new, accurate means for production control,**

**2. Working facts upon which budget standards can be set for cost control, and**

**3. New information for determining preventive maintenance procedures and programs.**

Success of the system has now led to installations in other Birds Eye plants—resulting in improved control of frozen food lines. Ability to standardize line-production volumes of various products has been a major benefit.

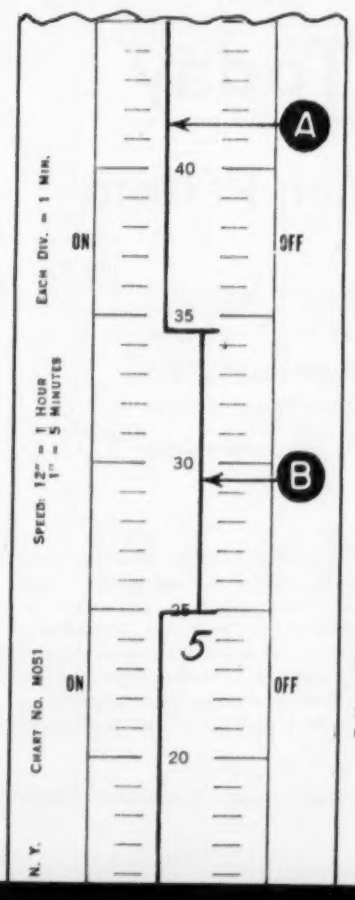



**CHART TAPE** times line operations by minutes, with 5-min. periods numbered. Ink line that stylus scribes (A) holds to "On" side during operations, moves to "Off" side—as seen (B)—when machine is down. Note jotted-in code numeral "5" (just below). This means that the 9½-min. off-time was due to stopping of wrapper. (Heat Timer Corp., New York City)

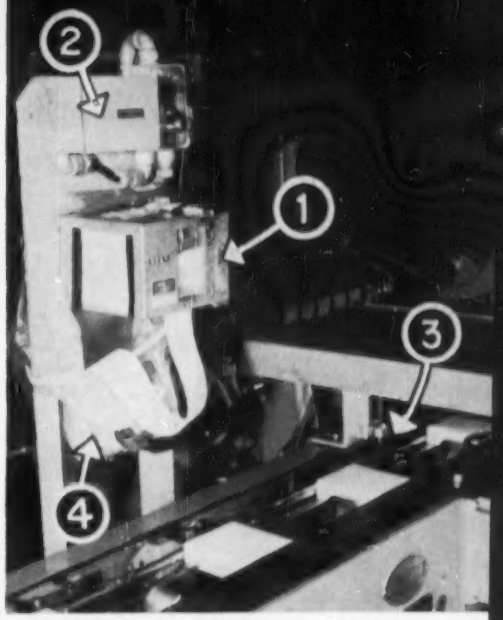
### Trouble-Shooting Sleuth

This vigilant line-productivity detective works automatically—with the single exception that an operator must make code notations on the recording tape to signify reasons for down-time on the line.

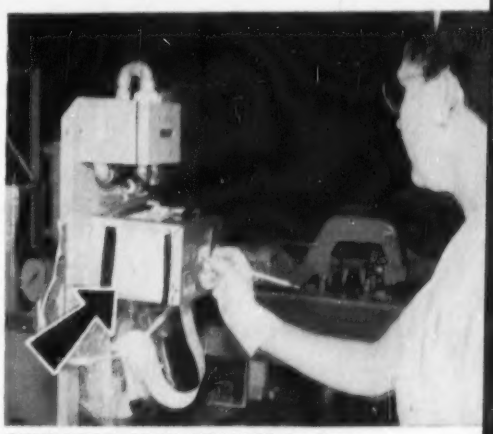
The system is comprised of two instruments—an automatic time recorder and a totalizer (made by Standard Instruments Corp. under the tradename "Time Recorder+Totalizer"). The stylus of the recorder marks the time and traces the duration of every on-off period of the wrapper. The totalizer records only the actual operating time of the wrapper, which corresponds to the "on" period scribed on the tape by the stylus.

A set of two stainless steel rollers accurately propel this chart-strip at a precise speed of 12 in. an hour. The chart is divided into hours and minutes, with the latter being designated in 5 min. intervals. The rolls are driven by a synchronous

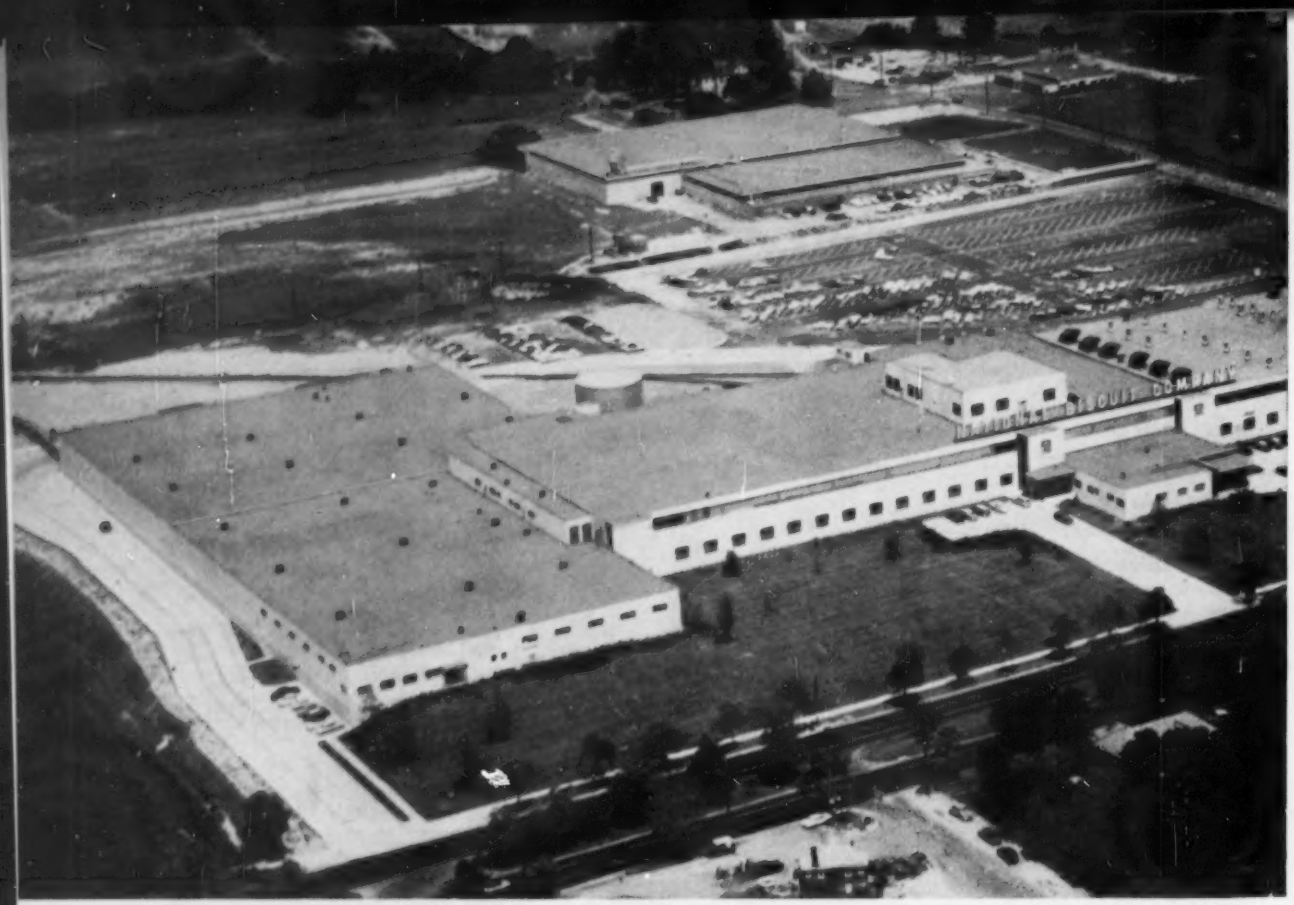
(Turn to page 146)




**INSTRUMENT MOUNTED** at the wrapper station. Key units are recorder (1) and totalizer (2). Latter is actuated when sensitive switch (3) is tripped by passing cartons. Seen (4) is zipper-equipped waterproof-film cover (opened here to take picture). This protects recorder, also catches chart strip.



**OPERATOR JOTS REASON** for line down-time directly on chart tape. It's simply done with a single code numeral. Checklist of the code is handy for her reference (arrow).



**NEW TWO-STORY BISCUIT AND CRACKER BAKERY** encompasses most modern production and packaging techniques. Raw materials are stored in tower (extreme right), ovens on 2nd floor facilitate 2-level straight-through operations.

# "Tomorrow's Plant Today"

## It Sets Engineering, Automation Pattern

**Extensive postwar experience in bakery design "cornerstones" advanced functional features in striking new facility. Outstanding are: Automatic ingredient-handling and formulating system, improved dough sheeting and cookie packaging, efficient gravity flow of raw materials, and straight line mass production . . . Second story cuts building cost, ups performance**

**ARTHUR V. GEMMILL**
Senior Associate Editor "Food Engineering"

TO PROGRESS in food manufacturing, you must have two vital production goals in your engineering sights. One is to achieve lower unit costs through advanced engineering. The other is to minimize costly errors through automation.

**Outstanding examples of how to do both are designed into the new Philadelphia bakery of National Biscuit Co.**

Capital has been made here of know-how gained through an extensive postwar program of better plant engineering and construction. And the most extensive automatic ingredient-handling and formulating system yet installed in a food plant is in operation in this plant.

**▶ Bulk shortenings and chocolate are received in liquid form, and stored**

**in heated tanks near points of use.**
**▶ Notable improvements have been introduced in dough-sheeting and cookie packaging operations.**
**▶ Efficient gravity flow is achieved by storing ingredients in a 160-ft. tower at one end of the 1,094-ft.-long plant.**
**▶ A dual electrical system guards against plant shutdown in event of power failure.**

Contrary to the one-story factory trend, a second floor is provided for baking—with important production-flow and building construction advantages.

Packaging is split between first and second floors, and there is ample first-floor space for efficient warehousing of finished goods and supplies.

One of the outstanding features of the new plant is the automatic batching system that feeds desired ingredients to any of the 16 sweet-dough mixers.

Its central nerve center is the large console designed by NBC and built by Richardson Scale Co. Located on the third floor of the tower, this unit automatically draws materials from their respective storage tanks, weighs and delivers them according to predetermined formulas.

## INGREDIENTS ARE AUTOMATICALLY PROPORTIONED

The console has easily accessible controls for 18 different scales, along with remote indicators for each scale.

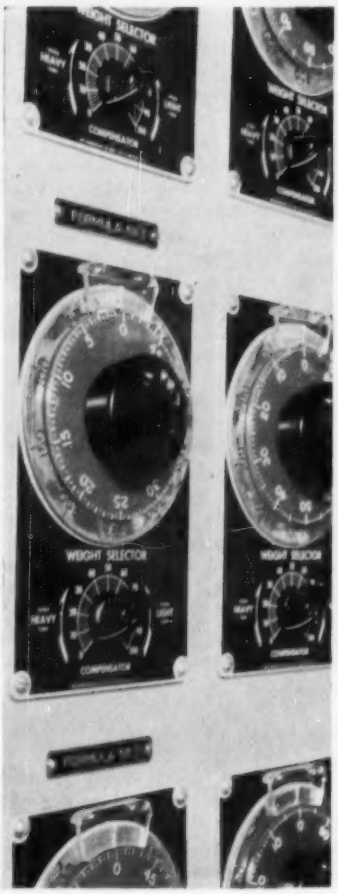
All scales, except the one for graham flour, have three sets of weight selectors so that three different formulas can be run through the system automatically. These selectors are on the inside of the console to prevent formula changes except by the authorized foreman.

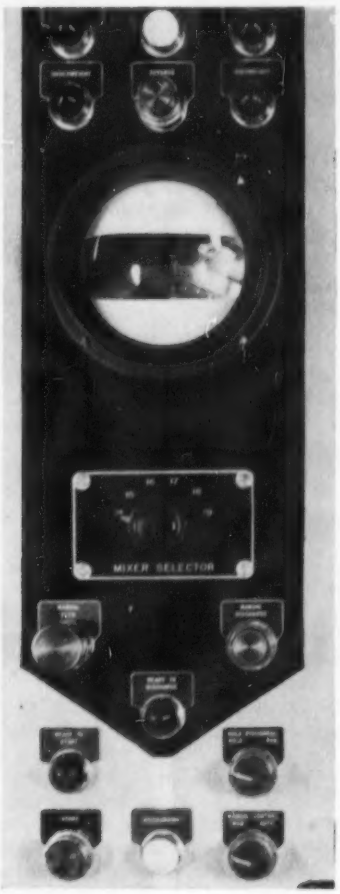
Other electrical interlocking includes arrangements to: (1) Cut off weighing operation if any scale exceeds established tolerances; (2) flash a signal light on control panel if any feeder or conveyor jams or is overloaded, and (3) maintain a complete pushbutton communication system between console operator and operators of each of the 16 dough mixers in the system.

### Efficient Ingredient Flow

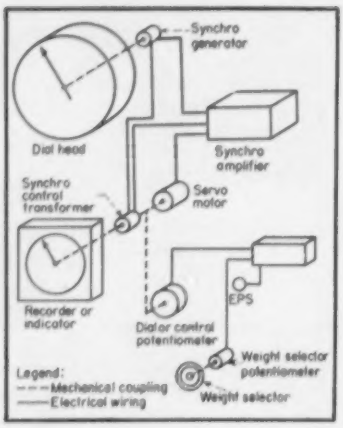
Flour and granulated sugar are stored in large steel tanks in the tower, and liquid ingredients in tanks on the 4th floor of it. Sifters for flours and sugar are on the 5th floor, with individual scales for all ingredients on the 4th floor.

Flour is aerated as it leaves storage tanks, which enables it to flow freely into screw conveyors that feed the sifters. These discharge to weigh-hoppers equipped with air cutoff gates. Delivery of flour and




**CONSOLE CLOSEUPS.** First photo shows weight selectors on which foreman sets up formulas for 16 dough mixers. Far right: Remote weight indicators and mixer selectors for each ingredient.




HOW ingredient weights are transmitted from 4th floor scales to remote indicators of console on floor below.

sugar from scales to mixers is by totally enclosed Polyplane conveyors.

Liquid ingredients are also weighed into the mixers. Water—automatically blended to desired temperature—is weighed directly. All other liquids are pumped to weigh-out scales, which deliver proper weights regardless of consistency of the material.

#### Foreman Sets Up Formulas

First step in the batching operation is setting up the formulas. This is done by the foreman on a group of weight selectors located inside the console. Once the formula is set up, delivery of correct amounts of ingredients to specific mixers is automatic.

On each of the 16 mixers there is a panel with a complete list of major ingredients, a formula card holder, group selector switch, signal button, and signal light that shows whether materials have been delivered.

The Richardson scales used to weigh out materials are fitted with special electronic instruments for remote control and supervision. These also can be operated manually when necessary.

The console is comprised of three sections, differing only in the number of ingredients handled (one of these sections is illustrated on following page). On the sloping front are separate panels for each mixer connected electrically with it. These contain ingredient listings and formula-card holders similar to those on the mixer panels. In addition, there are four group lights corresponding to the four positions on the mixer panel group selector, a mixer signal button, and the mixer number.

Vertical sections of the console comprise separate panels for each ingredient. Among controls on these panels are scale operating lights, remote weight indicators, mixer selection tap switches, manual feed, discharge, and bin selector buttons, and over- and under-weight indicators. The panel shows when anything goes wrong with the weighing and delivery system and, also, where the trouble is so that a mechanic can easily find and repair it.

#### How Batch Is Formulated

When the operator of a mixer wishes to prepare a batch of dough, he selects the first group (No. 1) of ingredients to be added, sets selector switch on 1, and presses the signal button. This actuates a buzzer at the console and turns on group light No. 1 in the panel for that particular mixer.

Console operator refers to his formula card and dials proper mixer, using selector switches representing ingredients in group No. 1. Then he presses respective "Start" buttons. In the case of dry materials this starts movement of ingredients from storage tanks to sifters to scale hoppers.

As soon as desired weight is in a scale hopper, above operation stops and feed valve opens, allowing material to drop into Polyplane conveyor that moves it to the mixer. Water is likewise weighed and piped to mixer. And the other liquid ingredients flow directly from the weigh-off scales.

When mixer operator is ready for additional ingredients, the above-described procedure is followed until the mixer is completely charged, then the system locks to prevent further additions.

The console tells its operator, by an intricate system of flow lines and pilot lights, a continuous story of the progress and flow of materials for each batch. This enables him to learn what ingredients, and how much of each, are being delivered to any mixer in the operation.

#### Why a Second Floor

The seven 300-ft.-long, gas-fired traveling band ovens are on the second floor for several reasons.

Most important of these were: (1) to economize on construction; (2) to enable flow of baked products to both first and second floors for packaging, and (3) to provide improved venting, and thus cut down ceiling height.

Each oven is equipped to handle several different products and three of them are set up to discharge products after cooling either to the 1st floor icing department or to 2nd floor packaging.

A further advantage of the 2-story facility is in providing more convenient locations for the icing kitchen and liquid chocolate blending. These are installed on the second floor directly above the icing and enrobing sections of the cookie lines, thus enabling gravity flow.

Movement of crackers and cookies from ovens to the packing department is on long cooling conveyors suspended from the first floor ceiling. In this department, packages are automatically formed, filled, weighed, sealed and wrapped, then conveyed to the shipping room.

Enrobed products are packed by hand and sealed automatically.

#### Building Highlights

The building itself is attractive from an architectural standpoint. It is of steel construction with an exterior of buff-colored Natco Dry Speed-Wall tile. The office areas are set off by deep maroon brick, which is also used to highlight other areas.

Window sash and screens are of aluminum, and wherever they are subject to glare on sunny days, the windows are glazed with special heat-absorbing glass.

Interiors have smooth-faced buff tile walls with pastel ceilings. Doors are eye-rest green. Fluorescent lighting is used in all manufacturing areas. A forced air ventilation system effects a complete change of air every 4 min. throughout the plant.

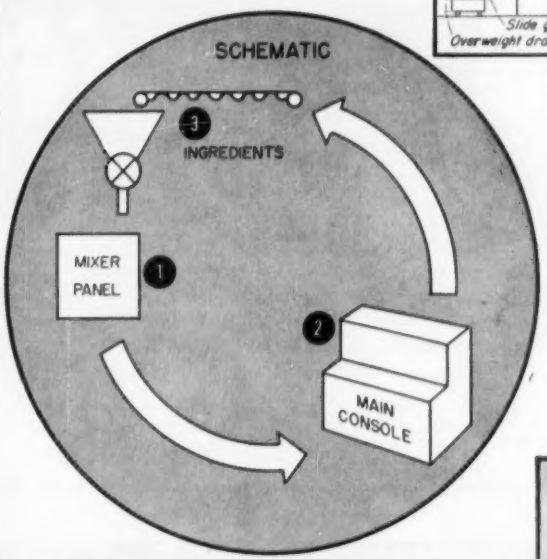
Floors are of various types. Polished hard maple (157,000 sq. ft.) is used in the baking machine area and packing rooms, asphalt and vinyl tile in employees' rooms and cafeteria, and vinyl tile and concrete in the baking department. Quarry tile is used in the mixing rooms, and Kalmann flooring in the warehouse, with Stelcon flooring in heavy trucking areas. Latter consists of 12x12 in. steel "tiles" set in concrete.

#### Dual Power Supply

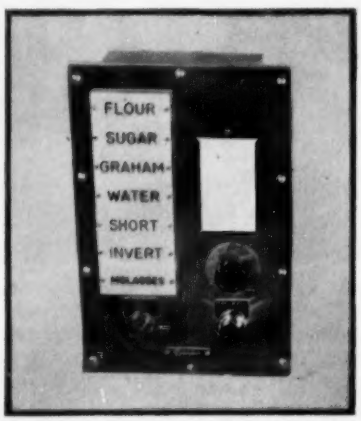
The electrical supply system is of an advanced type, with two separate

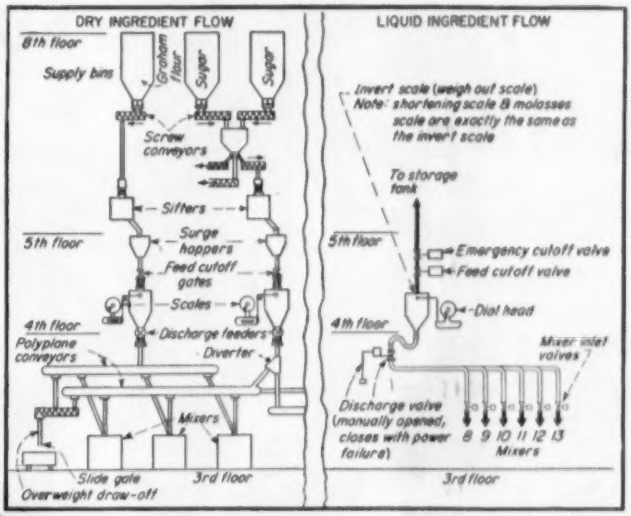
(Turn to page 133)

# AUTOMATED MIXING CYCLE

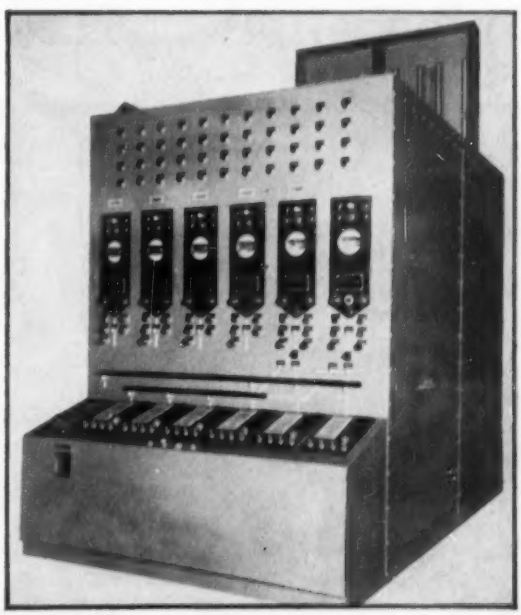



**1.** **MIXER PANEL.** Here signals originate that set automatic system in motion. As products are delivered to mixer, designations on panel as illuminated.




**3.** **INGREDIENTS** in desired weights are automatically transferred to mixer. Left: Drys move from large steel bins to sifters, then are weighed and conveyed to mixer. Right: Liquids are pumped to weigh-out scales and flow from there to mixer.

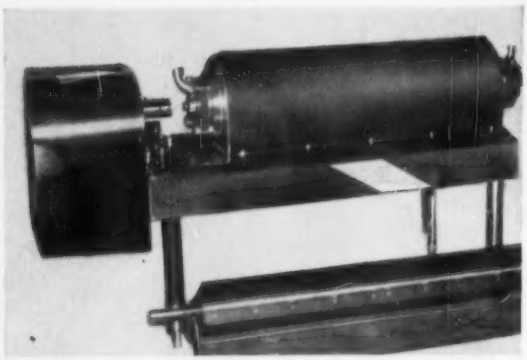


**2.** **MAIN CONSOLE** picks up signals and dispatched them to various ingredient storage tanks in tower.

# 50 Advanced Units

**New equipment for processing, sanitizing, filling, wrapping, coding, and materials handling displayed at bi-annual dairy exposition in Atlantic City**

**INSTANTIZER** converts small particles of hard-to-dissolve powders into easily dispersible clumps. Powder enters top, falls between agglomerating jets and through heated air stream, then discharges to sifter, which sizes it to required bulk density.—Blaw Knox Co., Mora, Minn. (62A)

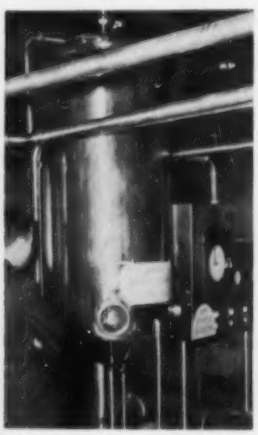


**UNIT** for continuous heating and cooling of liquids or semi-solid products through 0-400F. temperature range in closed system, employs water, steam, or Dowtherm for heating, water, brine, ammonia, Freon for cooling.—Creamery Pkg. Mfg. Co., Chicago. (62B)

## 5 DEODORIZERS

**Operating in conjunction with heat exchangers, they automatically remove volatile off-flavors and odors**

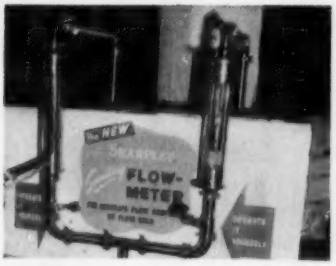
**VAC-HEAT** process receives product as it leaves heating section of plate pasteurizer, atomizes and further heats it in steam vapor, then flash-cools by vacuum. This removes vapor, odors, non-condensable gases.—Creamery Package Mfg. Co., Chicago. (62C)



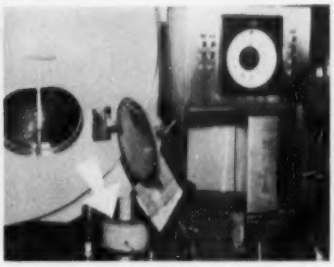
**PARA-VAC** takes product from forward port of flow diversion valve, injects steam as it moves to vac chamber. Here product is treated with wash steam.—APV Dairy Div., Buffalo, N. Y. (62D)

**AIR PURGE** draws air through product at two points—after regeneration, and at pasteurizing temperature—to remove entrained gases. Pyrex cylinders permit visual inspection.—York Corp., York, Pa. (62E)

# Eyed by Industry Processors

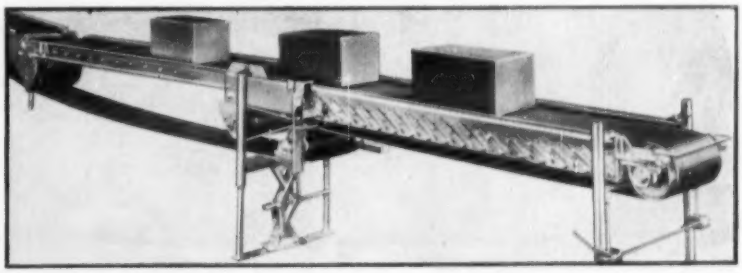



**SANITARY FLOWMETER** gives continuous sight-glass readings in lb./hr. Equipped with clamp-type fittings that enables easy installation.—Sharples Corp., Philadelphia. (63A)

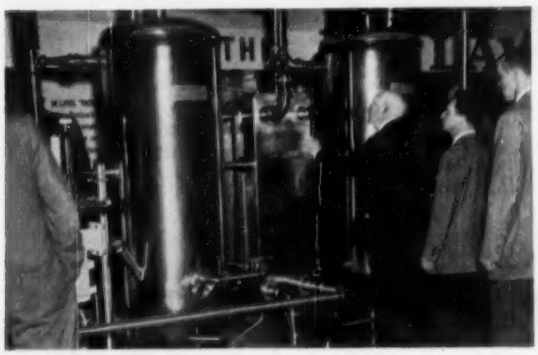


**HOW LOAD CELL** (arrow) can check receipts and plant losses was demonstrated. Cells under two legs of tank give weight readings on panels.—Cherry-Burrell Corp., Chicago. (63B)

**CONTINUOUS OVERHEAD** system converts unused space near ceiling of cold room to quick freezing area. Uses varispeed flexible screws to move load.—Richmond Mfg. Co., Englewood, N. J. (63C)

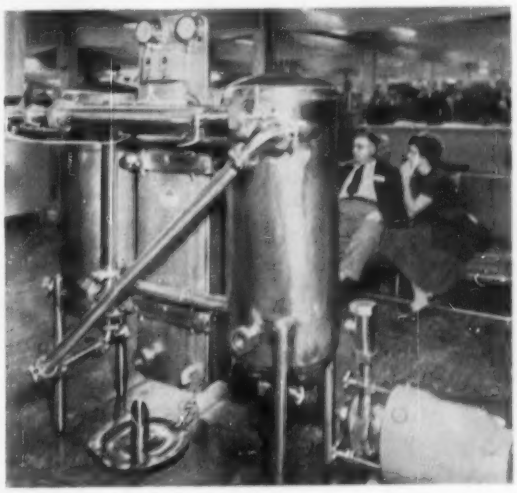


**TELESCOPIC** belt conveyor of roller-bed type can be retracted or extended up to 25 ft. without stopping belt and while conveyor is loaded.—Lathrop-Paulson Co., Chicago. (63D)



**VAC-THERM** draws product through regenerating section of plate unit into 1st vac chamber, where non-condensables are removed, feeds it to final heating section. From here, product enters 2nd vac chamber, where it flashes and gives off odor-laden vapors, then it's pumped to regenerator.—DeLaval Separator Co., Poughkeepsie, N. Y. (63E)

**For detailed data on units, circle key number on Readers' Service Card in back of book**



**ARO-VAC FLAVORIZER** assures uniform, year-round good flavor through steam treatment of heated products. This eliminates volatile off-flavor elements. Available in all flow rates.—Cherry-Burrell Corp., Chicago. (63F)

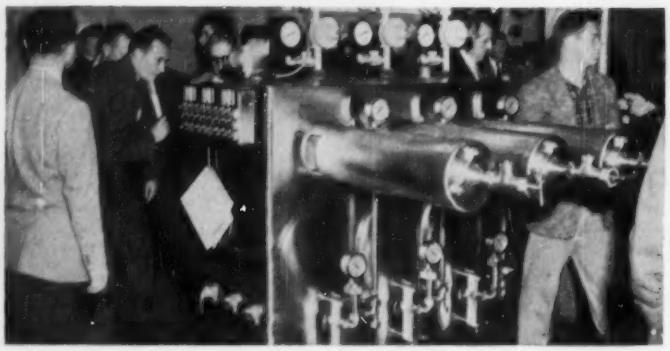
## 3 Case Handlers

**UNIT** automatically top-stacks any standard case 3-7 high at 3-20 per min. Fits conveyors 14-24 in. high. Operates on 110-220v.—Baker Box Co., Worcester, Mass. (64A)

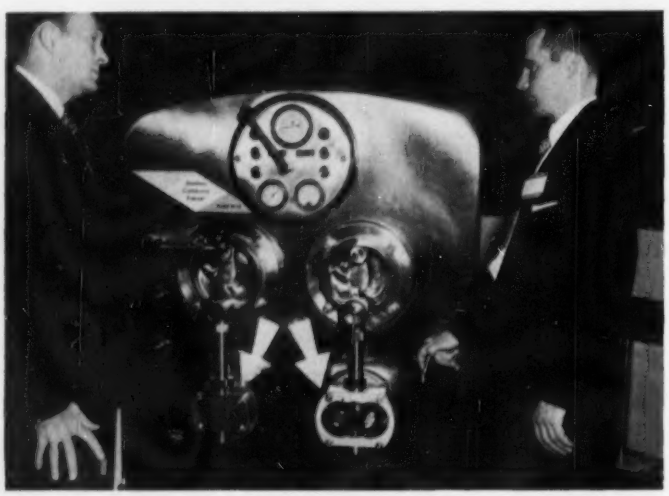
**TOP STACKER** handles wire or wood cases and carton boxes. Automatically adjusts for size or type. 1½ hp. motor lifts carriage, operates hydraulic pump.—Lathrop-Paulson Co., Chicago. (64B)

**UNSTACKER** removes cases from bottom of 2-6 high stack, discharges them, one at a time, to existing conveyor line. Handles up to 20 per min.—Mojonnier Bros. Co., Chicago. (64C)

## 3 New Continuous Freezers

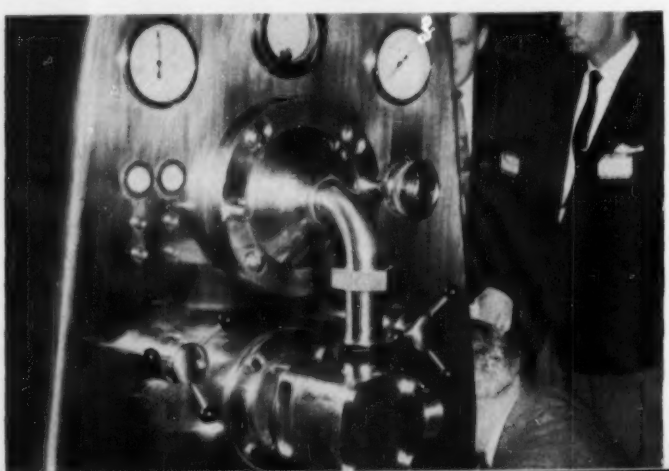


**FLEXIBLE UNIT** has three independently controlled 25-100 gph. freezing tubes mounted on single, streamlined frame. Ideal for small-plant and for large-plant specialty runs and extruding cut-wrap operations.—Cherry-Burrell Corp., Chicago. (64D)

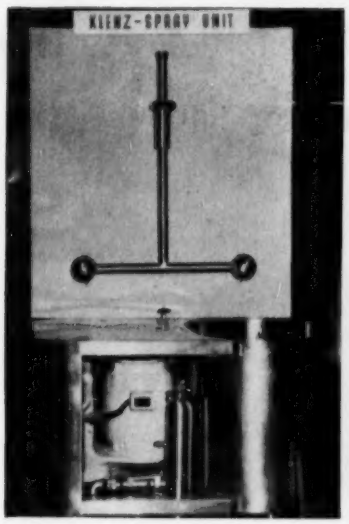


**HIGH CAPACITY** (75-275 gal. mix per hr.) freezer features two chrome-lined nickel cylinders. Has stainless reaction beater type dasher in 1st, new double-action one in 2nd. Employs positive rotary pumps (arrows) with resilient, long-lasting rotors.—Creamery Pkg. Mfg. Co., Chicago (64E)

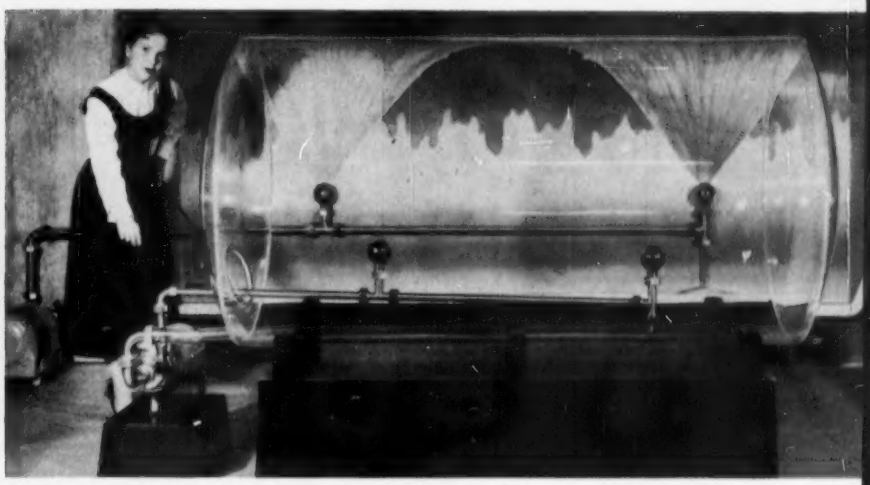
**FREEZER** has a capacity varying from 75 to 200 gph., 3-blade heavy service mutator, of new sanitary design. Features simple, efficient refrigerant controls.—APV Co., Inc., Buffalo, N. Y. (64F)



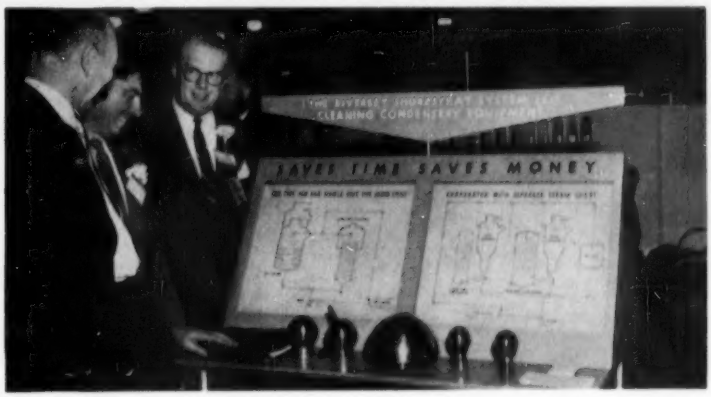
# 6 New CIP Devices, Control Panel




**PORTABLE SPRAY CLEANER** offers complete interior coverage of tank walls, plus ready disassembly by simple clamp arrangement.—*Klenzade Products Inc., Beloit, Wis.* (65A)



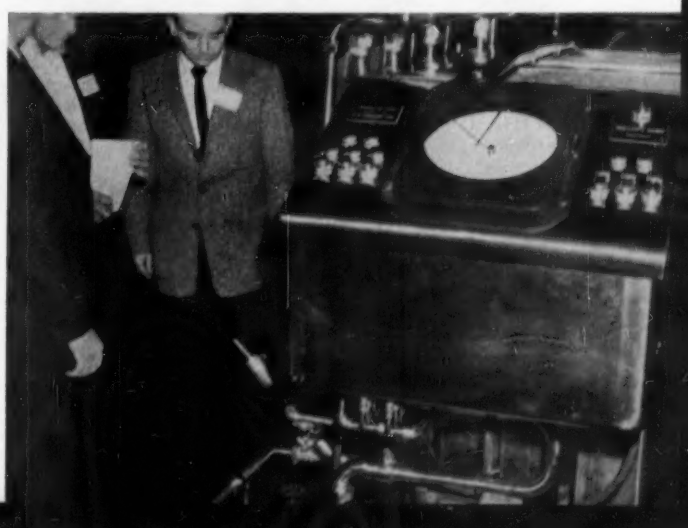
**PUMP-CONNECTED** ball-sprays deliver 40-45 gpm. of cleaning solution at 20 psi. to cover all tank surfaces. Chlorinated cleaner is added to water in tank.—Wyandotte Chemicals Corp., Wyandotte, Mich. (65B)



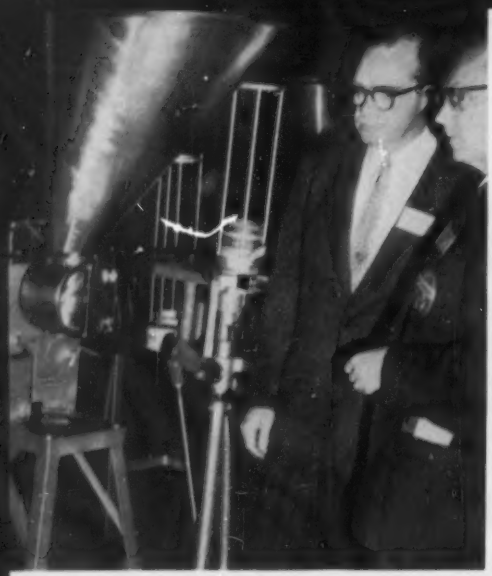

**SPRAY HEADS** are engineered for efficient in-place cleaning of condensing equipment without use of vacuum. System eliminates hand labor, operates with minimum solution, also permits sanitizing.—*The Diversey Co., Chicago.* (65C)

**3 COMPONENTS** of pushbutton CIP unit include time-temperature controls, and special valves with interchangeable parts.—*Taylor Instrument Cos., Rochester, N. Y.* (65D)

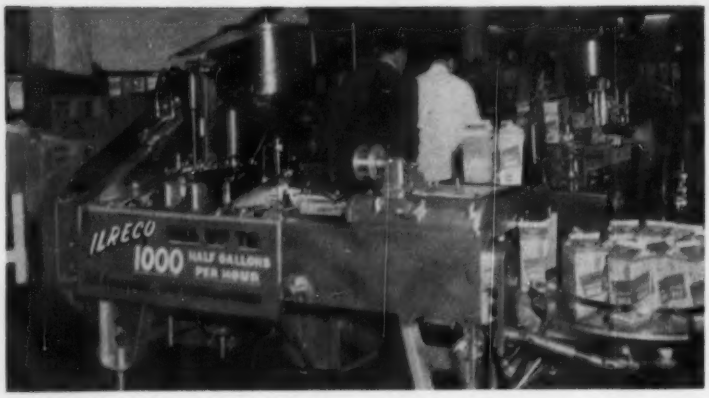
**STAINLESS CIP SYSTEM** offers automatic control of cycle time, solution temperature, and rinse water. Manual selector switch permits flexible operation, and entire cleaning cycle is recorded.—*W. M. Sprinkman Corp., Milwaukee.* (65E)



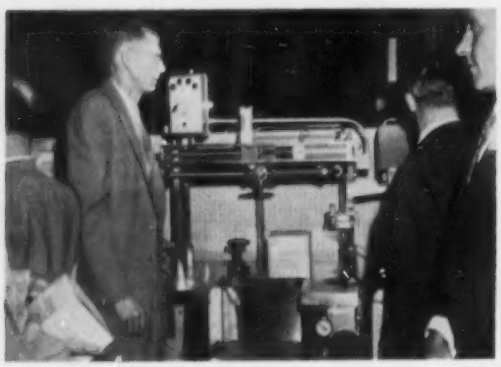
# 12 Fillers for Cottage



**COTTAGE CHEESE FILLER** uses rotary valve and positive displacement piston. Fills hand-fed cartons at 30/min., and sizes to 1 lb.—Anderson Bros. Mfg. Co., Rockford, Ill. (66A)

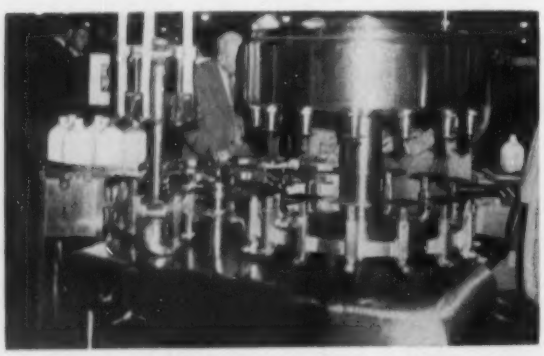



**SINGLE-PISTON** milk filler, with vacuum defoamer, takes nested, Pure-Pak cartons at a speed of 20 per min. Unit has air-operated de-nesting assembly and automatic lubrication.—Illinois Creamery Supply Co., Chicago. (66B)

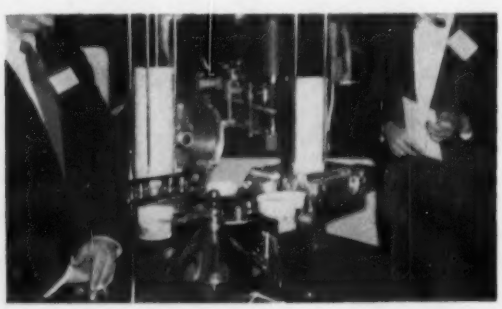


**SEMI-AUTOMATIC FILLER,** designed for cubical polyethylene containers, handles ½ to 6 gal. sizes. Heat-sealing attachment closes spout. Cube is contained in folding carton.—Mojonnier-Dawson Co., Franklin Park, Ill. (66C)

**COMPACT MILK FILLER** for ½-gal. size handles 16 cartons per min. Fully automatic in action, unit is specially designed to meet needs of small-volume producer.—Ex-Cell-O Corp., Detroit. (66D)

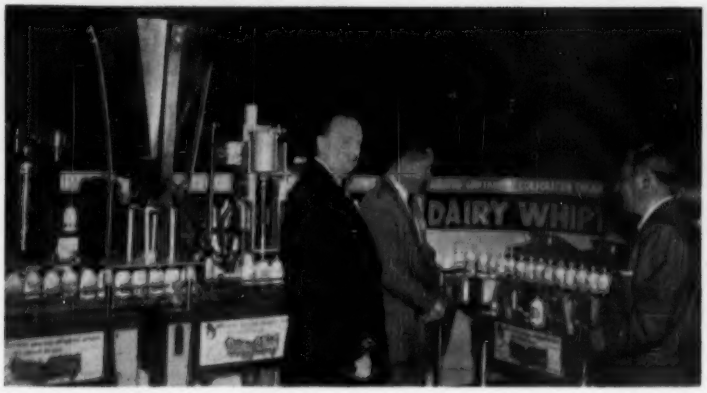


**WIDE RANGE OF SIZES**—from ½ pt. to 1 gal. containers—is handled by this filler. Unit is equipped with self-contained vac-piston valves. Capacity, when operating on gallon containers, is 36 gal. per minute.—Federal Mfg. Co., Milwaukee. (66E)

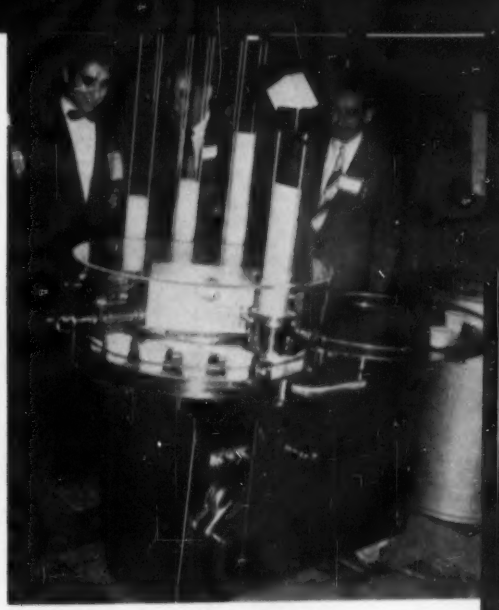


**SPECIAL VALVES** and cup-feed heads on this cottage cheese packager permit fast conversion between 8 oz., 12 oz., 1 lb., and 2 lb. containers. Unique filler design cuts curd breakage to a minimum.—Dixie Cup Co., Easton, Pa. (66F)

## Cheese, Cream, and Milk

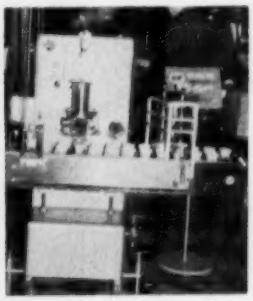



**AEROSOL PACKING LINE** starts with unscrambler (not shown) and runs through automatic filling, cap feeding, crimping, gassing, and shaking units. Capacity: 1,800 cans per hr.—Aerated Container Corp., Chicago. (67A)

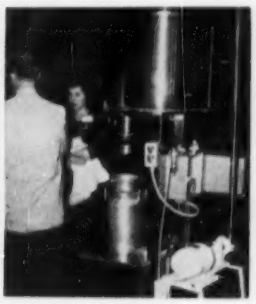


**HIGH-SPEED CUP FILLER** for ice cream has three, gear-type dispensers, and synchronizes to freezer output for speeds of 250/min.—Anderson Bros. Mfg. Co., Rockford, Ill. (67B)

**SPEEDY CHANGEOVER** from ½ pint to 1 qt. containers is specialty of this 120/min. filler.—American Can Co., N. Y. C. (67C)



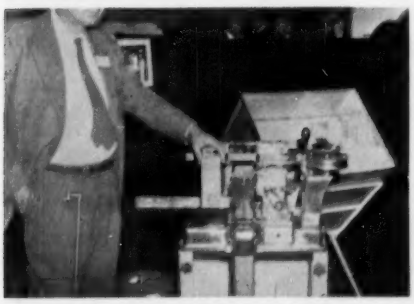
**DUAL-LINE** filler and capper has twin dispensing, filling, and sealing heads for cone cups.—Anderson Bros. Mfg. Co., Rockford, Ill. (67D)



**TIMED** control permits the semi-automatic operation of air-actuated can filler.—Ft. Wayne Dairy Equip. Co., Ft. Wayne, Ind. (67E)

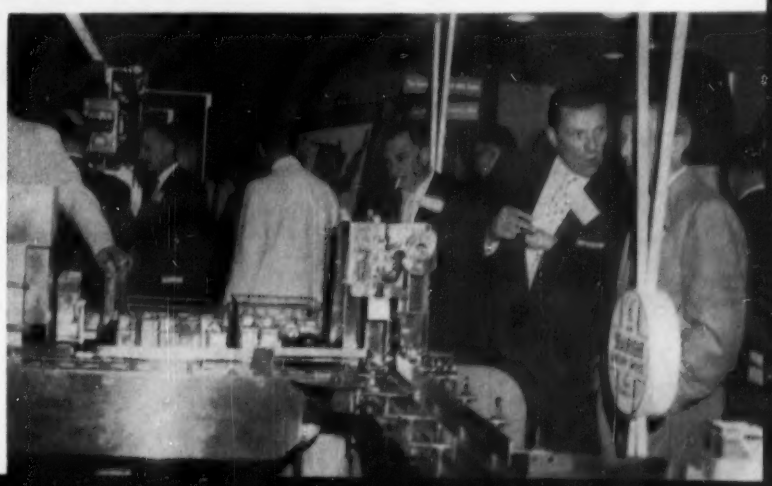
**CUP FILLER** for ¾ and 1 oz. "Dixies" proportions cream and viscous liquids. It caps the cups too.—Dixie Cup Co., Easton, Pa. (67F)

## 2 Multipackers



**HAND-OPERATED BANDER** offers compact, low cost method for joining two quart milk containers. Handle is inserted, then band feeds from roll stock.—Smith-Lee Co., Inc., Oneida, N. Y. (67G)

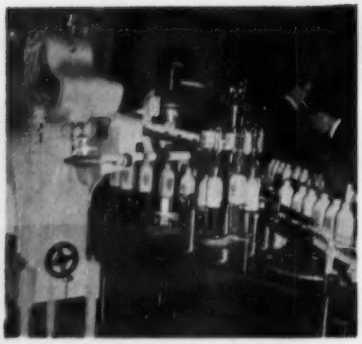
**CONTINUOUS MULTI-PACKAGER** automatically groups two quart milk cartons, forms and inserts a carrying handle between them, and glues cartons together. Full sanitary construction of machine components permits easy cleaning. Straight-line operation speeds production.—Sealright Co., Inc., Fulton, N. Y. (67H)



## 4 Cappers, 2 Coders

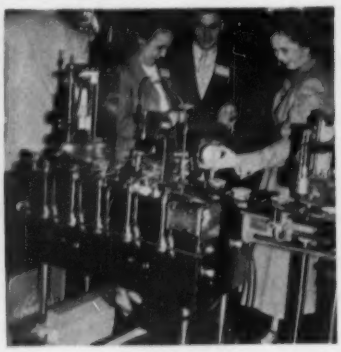
**PRINTED CAPS** are stamped from laminated, foil-and-paper roll-stock and applied to bottles. Electronic scanner insures registry. Coder date caps.—Basca Mfg. Co., Indianapolis. (68A)

**INLINE MARKER** applies codes or variety names to cup lids, and mounts on fillers or straight-line conveyors. Matches filler speeds.—Lily-Tulip Cup Corp., New York City. (68B)



**THREADED-CAP** former stamps aluminum milk closures from roll-foil stock. Extra deep caps are squeezed onto bottle threads.—Aluminum Co. of America, Pittsburgh. (68C)

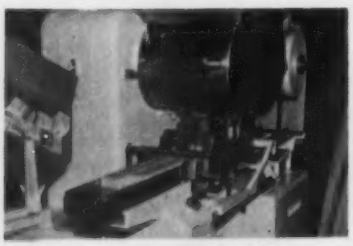
**CARTON CAPPER** unscrambles and applies round plastic lids. Unit handles 8 and 12 oz. sizes (50/min.), pts. (45/min.), qts. (25/min.).—Anderson Bros. Mfg. Co., Rockford. (68D)



**STRAIGHT-LINE CAPPER** applies foil-laminated disk closures, plastic lids, or aluminum cover caps to cheese cups. Speed: 30-50 per min.—Basca Mfg. Co., Indianapolis. (68E)

**MILK CAP CODER** operates independently of filler at speeds to 160 units/min. Star wheel trips air-actuated code slug.—American Seal-Kap Corp., L. I. City, N. Y. (68F)

## 3 Wrappers

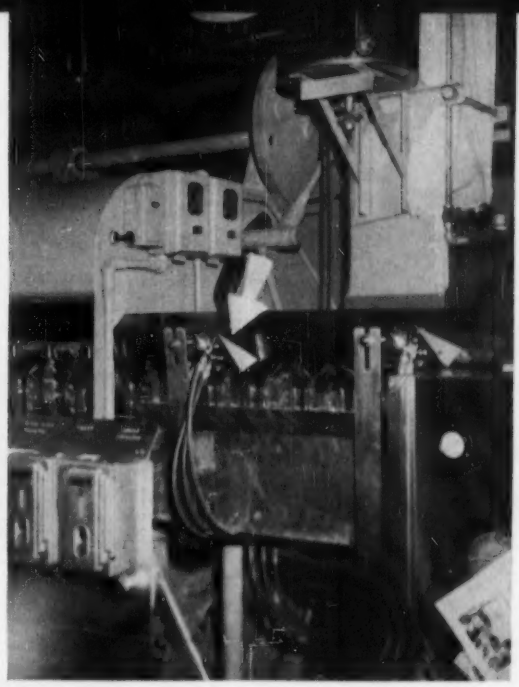


**BUTTER MOLDER & WRAPPER** take churned butter and turns out 30-60 ¼-lb., 1-lb., and ½-lb. cubes/min.—J. A. Gosselin Co., Ltd., Drummondville, Que. (68G)

**FROZEN NOVELTIES** are automatically wrapped at 800 doz./hr. on attachment to standard dipper. Unit uses seven rolls of wax paper.—Fulton Eng. Co., Inc., L. I. City, N. Y. (68H)

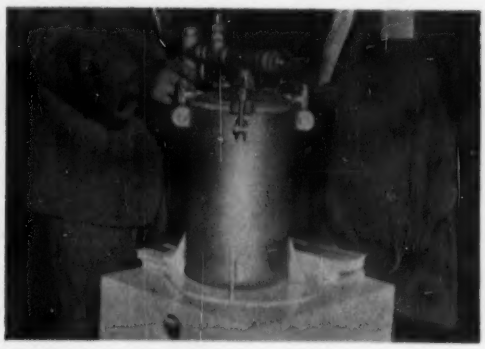
**ACCUMULATOR-WRAPPER** handles unfrozen ice cream. Packages eight pints or two half-gallons at speeds of 500-1,000 packages/hr.—Hayssen Mfg. Co., Sheboygan, Wis. (68I)

# 5 Miscellaneous Units



**COATING UNIT** (arrow), attaches to conveyor, sprays bottles (after each trip) from shoulder down. Employed is non-toxic modified silicone that boosts bottle's strength and scratch-resistance.—*Thatcher Glass Mfg. Co., Elmira, N. Y.* (69A)

**PAPER-CONTAINER DRAINER** and crusher empties returns at 54-72 per min. Automatically cuts container and folds back bottom, so contents empty without contacting outer surface, then crushes carton and discharges it to receptacle.—Wisner Mfg. Co., New York City. (69B)



**PORTABLE SANITIZER,** weighing 25 lb., delivers jet-like stream of hot detergent to ease cleaning of inaccessible spots. Unit is simply coupled to hot-water line (40-80 psi.), then filled with detergent.—*Oakite Products, Inc., New York City.* (69C)

**CAN-COVER RELEASER** mounts on roller or chain conveyor. Employs air-operated prongs that distribute hammer-like blows along underside of cover.—Damrow Bros. Co., Fond du Lac, Wis. (69D)

**NEW MULTI-FLO HOMOGENIZERS** feature gearless drives, stainless, sanitary gasketless head-blocks, stainless housings, easy reading gages. Large units (1,500-6,000 gph.) have 5 cylinders that practically eliminate pulsations and insure operation at full capacity without strain.—Creamery Pkg. Mfg. Co., Chicago. (69E)

KEEPING floors spic-and-span is a big item in food-plant sanitation. But it's only one of 11 major labor-cost factors which may be cut by systematic analysis of cleaning times and methods.

**Measure . . . Record . . . Compare**

**—That's National Biscuit Co.'s new technique for keeping sanitation-labor costs in line . . . By applying this method, you'll get a working formula for boosting your cleaning performance**

# Task-Analysis Is Your Key To Lower-Cost Sanitation

**R. S. TAGGART**
Assistant Sanitary Engineer, National Biscuit Co., New York City

FACING THE FACT that labor costs can comprise up to 95% of the charges for a sanitation program, it b.comes obvious that control of these costs constitutes the very heart of managing this essential function.

**This isn't to say, however, that sanitation control must remain a big bogie. Actually, it can be readily effected in any plant by systematic analysis of the tasks in question, followed by action as indicated.**

In its maple-floor routine alone, National Biscuit Co. has already saved $50,000 a year. And by further analysis and even newer methods, we expect that this figure will rise to $100,000 a year . . . Also, one of our plants with 19,000 sq. ft. of asphalt has cut costs $2,400 by improving its buffing . . . And another bakery saved about $1,000 a year by switching to power sweeping of its 147,770 sq. ft. of floors.

With savings also reflected in the other cleaning categories, we are convinced of the values in measuring our daily sanitation tasks. Recorded and analyzed, these facts are the guides for an improved program.

About a year ago, therefore, we launched our recording and analyzing of the distribution of daily sanitation lobor in our multi-plant operation, which encompasses some 50 bakeries. Although still in its formative stages, this system already has brought four notable benefits:

**1. It has revealed reasonable performance data for various sanitation tasks in a properly maintained plant.**

**2. Enabled comparison of cleaning efficiencies in similar bakeries, which provides incentive for cost cutting.**

**3. Pointed up specific tasks for which cleaning performance could be boosted by introduction of better equipment and methods.**

**4. Insured an equitable distribution of work loads, thus improving employee morale and job satisfaction.**

In this system, payroll hours of sanitation labor are

TIME CARD

DATE 6/12/56

NAME John Doe

CLOCK NO. XXX

| WORK ORD. NO. OR DEPT. | HOURS REGULAR | HOURS OVERTIME | NATURE OF WORK |
|---|---|---|---|
| | 7-9 | | Toilet Cleaning |
| | 9-10½ | | Stairways |
| | 10½-11½ | | } Wall Cleaning |
| | 12½-4 | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| TOTAL HRS | 8 | | |

**THIS TIME CARD** is filled out by each sanitor. It shows nature and duration of daily tasks. Foreman totals the time spent on each job at end of month.

## Summary Worksheet Shows Sanitation Efficiency

| SANITATION DEPARTMENT MAN-HOURS DISTRIBUTION | Daily Cleaning Hours | Total Hours Per Year | Average Hours Per Month | Annual Unit Cost | Average Performance |
|---|---|---|---|---|---|
| Maple floor sanding-edging | - | 48 | 4 | | |
| Maple floor buffing | 11 | 4320 | 393 | | |
| Floor sealing | 2 | 377 | 31 | | |
| Group 1 - Total | 13 | 4755 | 396-8.0% | 2.38¢/sq.ft./yr. | 155 hr./mo./100,000 sq.ft. |
| Asphalt tile waxing | ① | 331 | 27 | 14.82¢/sq.ft./yr. | 7.92 hr./mo./1,000 sq.ft. |
| Asphalt tile buffing | ⑤ | 1806 | 150 | | |
| Dry mopping | ⑮ | 1240 | 103 | | |
| Damp mopping | 9 | 2520 | 210 | | |
| Broom sweeping | 3 ② | 1241 | 103 | | |
| Vacuum cleaning | - | - | - | | |
| Machine scrubbing | 2 ① | 1196 | 100 | | |
| Power sweeping | - | - | - | | |
| Group 2 - Total | 37 | 8339 | 695-13.9% | 3.64¢/sq.ft./yr. | 129 hr./mo./100,000 sq.ft. |
| Industrial washing | 7 | 1567 | 131 | | |
| Steam room operation | 12 | 3134 | 261 | | |
| Group 3 - Total | 19 | 4703 | 392-7.9% | | |
| Tower cleaning | - | - | - | | |
| Stairways and elevators | 3 | 805 | 67 | | |
| Group 4 - Total | 3 | 805 | 67-1.3% | | |
| Overhead cleaning | 2 | 1077 | 90 | 0.47¢/sq.ft./yr. | 30 hr./mo./100,000 sq.ft. |
| Wall cleaning | - | 775 | 65 | | |
| Window-screen cleaning | 5* | 1242 | 103 | | |
| Roof cleaning | - | 4 | | | |
| Painting | - | 121 | 10 | | |
| Group 5 - Total | 7 | 3218 | 258-5.2% | | |
| Ventilation fans | - | 76 | 6 | | |
| Post heaters | - | 65 | 5 | | |
| Drain cleaning | - | 117 | 10 | | |
| Air-water equipment clng. | 4 | 124 | 10 | | |
| Ingredient tank cleaning | - | 221 | 18 | | |
| Group 6 - Total | 4 | 603 | 50-1.0% | | |
| Flour equipment cleaning | - | 388 | 32 | | |
| Insect control | 6 | 275 | 23 | | |
| Rodent control | - | 162 | 14 | | |
| Group 7 - Total | 6 | 825 | 69-1.4% | 0.36¢/sq.ft./yr. | 23 hr./mo./100,000 sq.ft. |
| Office cleaning | 14 | 2117 | 176 | 28¢/sq.ft./yr. | 18 hr./mo./1,000 sq.ft. |
| Personnel facilities | 17 | 8789 | 732 | $15.00/emp./yr. | 95 hr./mo./100 emps. |
| Uniform & laundry | 24 | 7022 | 585 | $12.00/emp./yr. | 75 hr./mo./100 emps. |
| Locker room attendance | 8 | 2079 | 173 | $3.54/emp./yr. | 22 hr./mo./100 emps. |
| Stock room | 4 | 1308 | 109 | | 229 hr./mo./100 emps. |
| Group 8 - Total | 61 | 21315 | 1776-35.6% | $36.30/emp./yr. | 39 hr./mo./100 emps. |
| Waste collection | 11 | 3048 | 254 | $6.11/emp./yr. | |
| Garbage room | 2 | 547 | 46 | | |
| Incineration | - | - | - | | |
| Baling | - | - | - | | |
| Group 9 - Total | 13 | 3596 | 393-7.9% | | |
| Plant guarding | 32 | 8400 | 700 | | |
| Elevator operation | - | - | - | | |
| Grounds maintenance | 15 | 2445 | 204 | $216.00/acre/yr. | 14 hr./mo./acre |
| Group 10 - Total | 47 | 10845 | 904-18.2% | | |
| Shipping - sales - garage | 5** | 1113 | 93 | | |
| Warehouse | 7** | 1298 | 108 | | |
| Assembly | 4** | 453 | 38 | | |
| Mixing - make-up - cooking | 10** | 2971 | 248 | | |
| Baking | 64** | 14959 | 1247 | | |
| Packing | 64** | 15933 | 1328 | | |
| Icing - cake | 11** | 5872 | 489 | | |
| Maintenance and repair | 6** | 849 | 71 | | |
| Cone - pretzel - wafer | 12** | 1399 | 108 | | |
| Cafeteria | 12** | 1834 | 153 | | |
| Group 11 - Total | 185 | 46681 | 3890-43.9% | | |
| GRAND TOTAL | 381 | 106461 | 4982 | | |
| Sanitation supervision | 24 | 6372 | 531 | | |

* - Entered in blue on actual form in order to show labor charged to the Sanitation Dept.

** - Entered in red on actual form to indicate sanitation labor charged to other departments.

**LABOR-DISTRIBUTION FORM** lists 50 sanitation tasks and assembles them in 11 groups. Recorded here are cleaning hours per day, total hours per year, and a monthly average. Also shown are typical unit costs and average job performances that are derived from this data. Circled figures (second column) represent hours of labor performed as part of operations in other groups, hence are not counted twice in the daily total. However, they are required for computing average performance and unit cost of a particular task (as shown in fifth and sixth columns).

broken down into 11 groups listing a total of 50 tasks (see chart). This list is fairly complete in describing the work of our sanitors.

**Moreover, it can readily be adapted to other types of plants by substituting or including other jobs performed.**

#### Compiling the Data

At each bakery, the sanitation foreman assembles daily labor-distribution records from time cards kept by individual sanitors. Where an employee has a fixed assignment it is not necessary to repeat a time card daily, but unusual tasks or diversions from the ordinary routine are reported. In some cases, assistant foremen make out the cards for men in their crew.

Time spent on each task is totaled at the end of the month. And every three months, reports are submitted to the New York office for summary and review.

To clarify these labor distribution records, let us consider some of the items of the various groups on the list:

1. **Sanitary-Floor Maintenance:** Sanding, buffing, and sealing of some 6,000,000 sq. ft. of maple flooring.

We might note here that we have found these floors excellent for many areas in our bakeries, and we take pride in their softly-bright, clean appearance.

Thanks to analysis of labor costs in maple-floor cleaning and maintenance, we are now saving at least $50,000 a year on this item alone. By extending better maintenance methods to all such floors, it is probable that savings will rise to $100,000 a year.

Economy has been achieved largely by changing from a drying-oil floor seal, which required frequent buffing, to a tougher, water- and grease-resistant finish. The latter can be kept clean by dust mopping and requires only buffing for renewal of the surface.

At one of our large bakeries, labor cost for maple-floor maintenance has dropped from 7.3c. to 1.5c. per sq. ft. per yr. This represents an annual saving of over $15,000 through this improved method of floor maintenance—proved by labor records.

2. **Floor Cleaning:** Waxing and buffing of asphalt tile, dry and damp mopping, hand and power sweeping, vacuum cleaning, and machine scrubbing.

We analyze and compare these labor costs on the basis of time spent per unit area cleaned. Hours per 100,000 sq. ft. of floor cleaned per month comprise the standard unit, except for asphalt tile cleaning. Here we use 1,000 sq. ft. as the unit area.

In our newer, larger bakeries, we consider as very good performance a labor expenditure of 300 man-hours per 100,000 sq. ft. of floor area kept clean per month. This amounts to about 7c. per sq. ft. of floor per yr. Where there is congestion or other adverse factors, this cost may be increased several times.

Substantial savings have also been made, as a result of labor analysis, in the maintenance of asphalt tile. It was found that the frequency of buffing and the time spent on it varied widely. At one of the larger bakeries having 19,000 sq. ft. of asphalt tile, a saving of over $2,400 a year was made by establishing a more uniform buffing routine.

Our experience has shown that asphalt tile in offices, cafeterias, and dressing rooms can be attractively maintained with about 5 hr. of work per 1,000 sq. ft. per month. This amounts to about 10c. per sq. ft. per yr. for keeping this type of floor waxed and buffed. We are very interested in the new non-buffing resinous finishes, and believe that costs may be further cut by their use.

Power floor scrubbers and power sweepers have proved economical tools in our bigger bakeries. Because it becomes feasible to increase the amount of floor cleaning when they are placed in service—with an accompanying improvement in plant cleanliness—the saving in labor is not always evident.

At our Atlanta bakery, which has a total floor area of 359,442 sq. ft. and where 147,770 sq. ft. are cleaned daily, a labor saving of about $1,000 a year was made by the use of a power sweeper. Labor required for floor cleaning dropped about 14% with use of the sweeper.

3. **Out-of-Place Cleaning:** In contrast to in-place cleaning, this represents all washing of portable equipment, which is done in special industrial-washing rooms having a variety of cleaning devices.

This task involves handling of many items. In addition, there are variations in equipment, containers, and utensils from bakery to bakery. Thus, each sanitation superintendent or foreman checks washing efficiency by making a daily tally of work done under his supervision. As a general guide, we compare the amount of washing done in bread bakeries on the basis of tonnage produced.

4. **Area Cleaning:** Keeping stairwells, elevators, and towers clean.

In the older, multi-story plants, cleaning of stairwells was an expensive and burdensome chore. With construction of modern bakeries, this expense has been greatly reduced.

However, in new plants, bulk-handling of flour, sugar, and shortening is done in towers that present peculiar cleaning problems because of extreme heights and large size of bulk containers. Cleaning of these storage towers has become part of the sanitation department's program and we are recording and following man-hours spent in this work.

5. **Structural Cleaning:** Interior surfaces above the floor. We include painting in this group, too, because it's associated with washing of walls and ceilings.

Performance is computed and compared on the basis of unit areas cleaned. In our large bakeries, we spend about 85 hr. per month per 100,000 sq. ft. of plant area in carrying out this group of cleaning tasks.

6. **Special-Equipment Cleaning:** Our chart gives partial data for units included in this group.

Differences in equipment and variations in operations have thus far precluded our establishing norms for this work.

7. **Pest Control:** Insect and rodent control, including cleaning of flour-handling equipment.

These tasks involve a relatively small percentage of the sanitor's time. But they are of top priority, as emphasized by FDA.

Since this pest-control work is proportional to the size of the plant, we use 100,000 sq. ft. of floor space as a basis for making labor comparisons. The mean figure for doing this work is about 40 man-hours per 100,000 sq. ft. per month. It is somewhat greater in the southern plants and slightly lower in our Canadian plants due to the effect of climate on this problem.

8. **Personnel Facilities:** Cleaning of offices, lunchrooms, smoking rooms, dressing rooms, and toilets. Handling of uniforms and laundry are also included here.

From the standpoint of man-hours, this group is one of the largest, usually requiring at least one-third of the sanitor's time. We have emphasized that cleanliness of personnel facilities must never be sacrified to economize on labor. But because these duties are such a large part

of the sanitation program, waste and inefficiency cannot be tolerated.

It is evident that, as attention is focused on good methods, cleaning of offices is being done at more uniformly satisfactory rates. The mean figure for office cleaning in our larger cracker bakeries has been cut to 18 hr. per 1,000 sq. ft. per month.

Because cleaning practice varies at the different bakeries, we find it expedient to combine the items "Personnel Facilities" and "Locker Room Attendance" for computing time spent per 100 employees per month in arriving at figures for comparison. On this basis, about 76 hr. a month per 100 employees are required in properly run plants to keep these facilities in good order. In handling uniforms and laundry, the mean figure on one of our recent compilations was 57 man-hours per 100 employees per month.

**9. Waste Disposal:** Collection and disposal of solid wastes.

Again, variations in arrangements and methods of doing this work are reflected in the labor figures. Where sanitors handle combustible wastes in incinerators, time spent is of necessity greater than in those plants where wastes are emptied into a Dempster Dumpster or a standing truck body, and hauled to an outside disposal point by a contractor.

At one plant, our firemen operate the boiler room and run the incinerator, thereby saving labor. Lacking the tonnage of waste produced, we compare time spent for this task on the basis of each 100 employees in the plant, assuming that amount of waste tends to vary in proportion to number of workers.

**10. Auxiliary Services:** Guarding of the plant, elevator operation, and grounds maintenance.

Our figures for this group again reflect the setting of the plant, its construction, the climate, and other factors. We compare time spent on grounds maintenance on the basis of number of acres cared for.

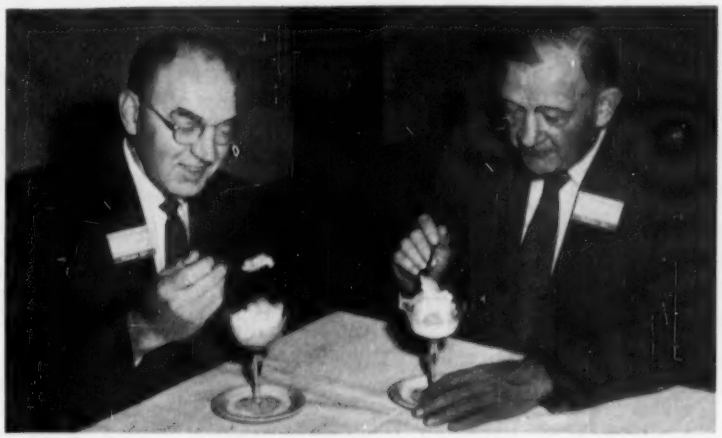
Our newer plants are attractively landscaped and are kept presentable by a reasonable expenditure of labor. For the months of April, May, and June, figures varied from 20 to 60 hr. per acre per month. Southern plants, of course, required more landscaping work during this period than northern ones.

**11. Departmental Cleaning:** Shipping, sales, garage, warehouse, assembly, baking, packing, icing, mechanical maintenance, and cafeteria.

Due to differences in production, equipment, and organization, the sanitary maintenance assistance given other departments varies considerably. Where all cleaning is done by the sanitation department, cleaning of food machinery requires about as much labor as caring for the rest of the plant.

The above discussion outlines one system of measuring and analyzing the use of sanitation labor, but it is only part of the undertaking. The compilation and review of data must be followed by the establishment

(Turn to page 188)



NEW PEACH TOPPING for ice cream is sampled by William Long, secretary of Colorado Press Assn. (left), and H. L. Dotson, vice-president of Colorado A&M.

### Fruit Too Ripe to Ship Utilized in

# New Tasty Topping

**FRANK PITMAN**
Special FE Correspondent, Denver

RESEARCHERS at Colorado College of Agriculture & Mechanics, Fort Collins, have now developed a way to make use of Freestone peaches that are too ripe to send to market.

**They are made into a topping—part sliced peaches and part puree—for ice cream and shortcake. The uncooked topping is frozen in 10-lb. cans.**

This topping answers the major problem that Freestones ripen very fast—both on the tree and after picking. Such fruit becomes too soft for shipping and has to be discarded or sold at reduced prices locally.

**Developed initially for Elberta peaches, the process can also be used for strawberries, raspberries, or similar berries.**

#### Way It's Done

At the Colorado college, best quality fruit was first segregated for slicing. This fruit was doused in hot water, peeled by hand, then sliced.

The rest of the peaches—those for making the puree—were trimmed (not peeled), and then halved to get rid of the pit. They then were put through a stainless steel pulper operating on the tapered-screw principle.

Resulting juice was collected in one container, while the coarser pulp and skins to be discarded went in another. The juice and less-coarse pulp was then combined as a puree and added to the sliced peaches. Ascorbic acid was finally added to prevent discoloration.

Finished topping was packed in No. 10 cans in the A&M tests. Contents per can comprised 2½ lb. of sliced peaches and 4½ lb. of pectinized puree, plus sugar. Researchers used slow-set pectin and calcium salt so puree would thicken without heating.

**Further, the straight pectinized puree can be used successfully in ribbon or ripple-type fruit ice cream.**

# 3-Point Progress on Canning Line

**EDWARD PLEUS and JOHN V. ZIEMBA**

*Respectively, Plant Engineer, Lincoln Canning Co., Merrill, Wis.; and Associate Editor, "Food Engineering"*

- **Bulk Handling: Streamlines deliveries and feeding to process**
- **Built-in machine washer: Improves cleaning and saves process time**
- **Holder-Conveyors: Bring new product-transfer efficiency**

IMPROVEMENTS in three operations—delivering beans from field to cannery, washing bean snippers, and feeding whole beans from graders to blancher—have paid high dividends at Lincoln Canning Co., Merrill, Wis.

Output has thus been increased, and costs reduced. What's more, employee morale has been raised by making the work easier.

## I—BULK DELIVERY

The recent switch to bulk handling of beans in pallet-type, wirebound boxes has assured mass-production efficiency. The new way replaces the former tedious field-to-cannery shipments in 40-lb. mesh bags.

Benefits add up this way:

**1. It now takes but two men—instead of six—to feed product to the bean cleaner.**

**2. Beans are delivered in better condition, since they are not so compacted when carried in the large 600-700-capacity pallet boxes. Bagged beans were more subject to losses from spillage and crushing when stacked.**

**3. Chance of contamination of product from wet bean sacks is now abolished.**

**4. The bulk unloading makes for a more uniform flow of beans as they are conveyed to the bean cleaner. This permits more time and care to be given to their inspection.**

The pallet-type boxes (about 300 were supplied by Wausau Box Co. of Merill) measure 30x39x40 in. Each has three wooden cleats (1x3 in.) bolted to the bottom, thus allowing the boxes to be interlocked when stacked.

### Fork-Lift's Role

Efficient handling starts at bean stations in the field. Here, green and wax beans are graded, weighed, and loaded into the pallet boxes. Arriving at the cannery, boxes are transferred to the processing line by a Towmotor fork-lift truck with a rotary mast.

The truck tilts each box so that beans are gently tumbled into a company-built metal feed hopper holding about 1,500 lb. Hopper is of sheet-metal and angle-iron construction, with a discharge chute pitched 4 in. to 1 ft. When necessary, a fork-lift truck can readily remove the hopper from the production line.

Discharged from feed-hopper chute, beans are manually guided and transferred with a long-handled fork onto an inclined flight conveyor feeding a vibrating-screen and exhaust blower-type bean cleaner. At this stage, the worker carefully inspects beans for foreign objects.

The former bag-dumping method did not provide workers sufficient time to check beans. Moreover, bag-dumped beans tended to pile up at the in-feed conveyor. And it was virtually impossible to detect foreign material within these piles.

Free of dust, dry leaves, etc., cleaned beans are now transferred at 4½-tons an hour by belt conveyors and baffles to eight rotary type bean snippers set up in tandem.

## II—AUTOMATIC CLEAN-UPS

Second in Lincoln's three stages of improvements is the efficient built-in cleaning system installed at the bean snippers.

**It has stepped up snipper output another 200-300 lb. per hour. And equally important are the man-hours it saves, while getting more efficient clean-ups.**

Formerly, it took two men 4 to 6 man-hours to clean the bean snippers at the conclusion of each daily operation. Each man spent 30 to 40 min. going over each of these units with brushes and steam hose.

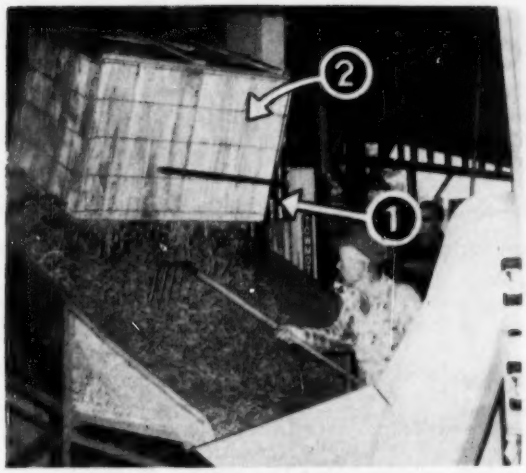
But now this cleaning takes place automatically during production breaks (morning, noon, and midafternoon). It's done merely by cracking valves. Cleaning of all eight bean snippers is simultaneous and requires only 5 min. during each break.

Gummy, waxy bean residues are easily removed. And no longer does steam-hosing "bake on" these residues, to create costly man-hours of work to remove them.

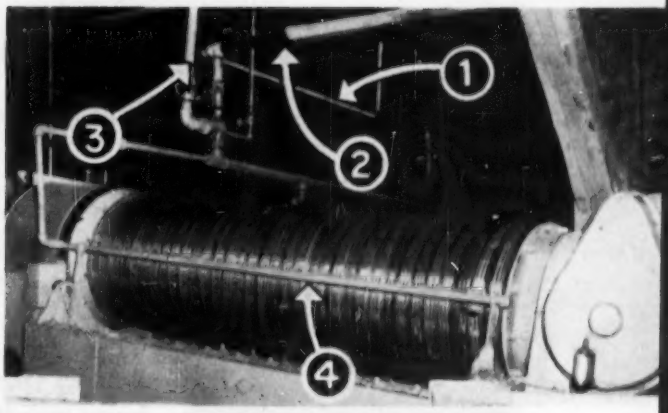
The cleaning is now achieved through a simply designed system that periodically sprays the bean snippers with a detergent (Hydrosol, made by George Stearns Chemical Corp., Madison, Wis.). Efficiency is improved by the fact that this detergent has water-softening properties.

Gravity fed from drums, the detergent goes through a ¼-in. pipeline into a McDaniel suction feed hooked to a 1½-in. hot water (150F.) line. This line then bleeds into eight horizontal ¾-in. pipelines, one running alongside each snipper. Each of the latter pipelines contains 150 perforations.

The cleaning cycle comprises a 2-min. hot water




I **MECHANIZED DELIVERY** of beans into cannery's production line wins big savings in labor, also improves product quality. Beans now come in bulk lots from fields in pallet-type wirebound boxes holding 600-700 lb. The old 40-lb.-capacity cotton mesh bags are out. At plant, lift-truck (1) empties whole box load (2) into company-built feed hopper.




II **CLEANING** of rotary bean snippers is now automatic—saving labor. It's done during production breaks, thus upping output another 200-300 lb. an hour. New yet inexpensive, system uses special detergent, with water-rinse following. Indicated are lines carrying detergent (1), steam (2), and water (3). Perforated pipe (4) spray-cleans unit.

(150F) rinse, 1-min. spray with 150F. detergent, and another 150F. water wash-down.

Detergent to clean eight snippers three times a day for 50 days amounts to about 40 gal.

## III—CONTINUOUS FEEDING

Now to the third innovation—the continuous company-devised system of feeding whole beans from rotary reel-type graders to the steam blancher. This new way—

**1. Eliminates the need for the former six-worker crew that collected whole beans from graders, put them in 30-lb. wooden boxes, and then lugged them almost 100 ft. and fed them manually into the blancher.**

**2. Provides for an extra inspection and water-wash.**

**3. Gets rid of over 150 wooden boxes, thus making the system more sanitary. Abolished is the previously required routine of washing and handling the boxes. And spillage losses formerly entailed by the boxes are done away with.**

**4. Saves valuable floor space.**

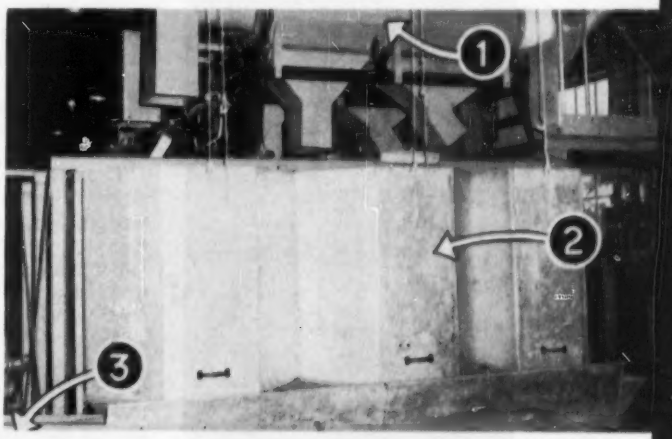
The new system operates in this simple manner:

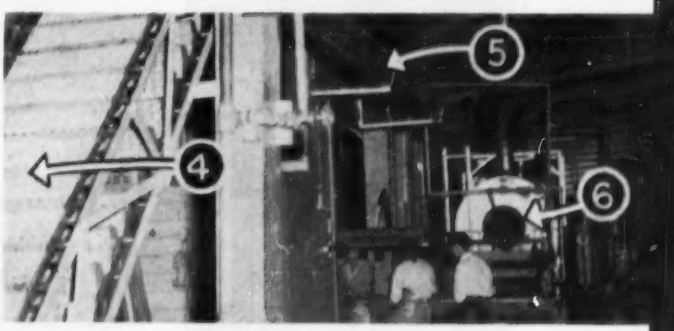
Whole beans coming from pre-graders are conveyed by inclined belt to a pair of final graders mounted directly over three side-by-side rectangular metal bins. Graders divide the beans into three sizes, with each size chuted into separate 1,000-lb.-capacity bins.

Bins, too, are of sheet-metal and angle-iron construction. Bottom of each bin is pitched (4 in. to 1 ft.) for discharge of the beans onto a horizontal inspection belt.

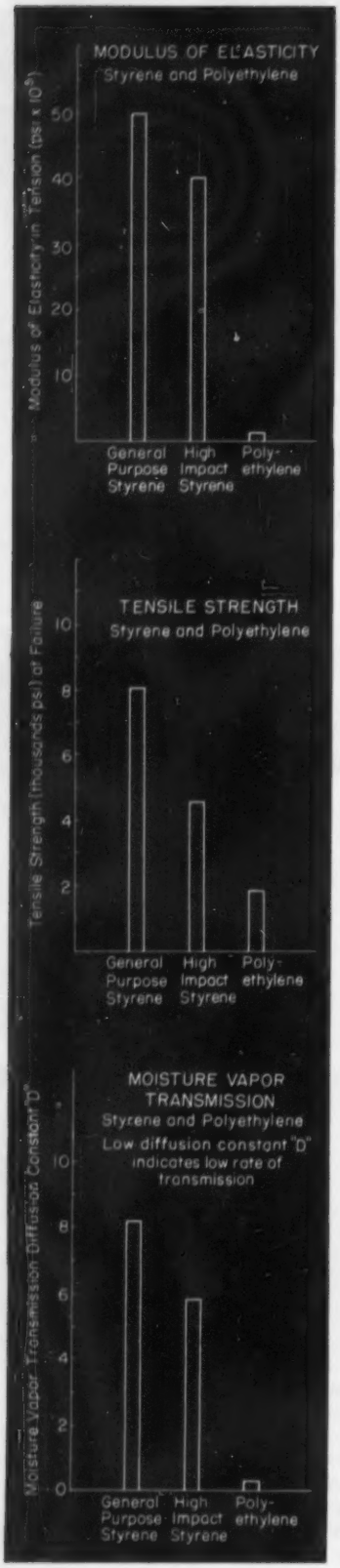
A bucket elevator then transfers inspected whole beans (one size at a time) to a flume that washes and feeds them into a steam blancher for a 3-min. blanch at 180F. Beans are inspected before and after blanching.

Processing of cut beans is carried out in a similar efficient manner.




III **NEW HOLDING & CONVEYING EQUIPMENT** abolishes tedious manual box-transfer of whole beans from graders to steam blanchers. Top: Beans discharge from grader (1) to 1,000-lb.-capacity holding bins (2) that deliver them onto inspection line (3). Above: Bucket elevator (4) then transfers them to flume (5) for direct feeding into blancher (6). Eliminated: 150 boxes and all their handling, cleaning, and storing.




# Molded Plastic

## —What to Check When Selecting It

**Traits of materials—relative to meeting (1) your end-requirements and (2) your design factors—give tipoff for use of versatile styrene and polyethylene**

**BENNETT NATHANSON**
**Technical Service Representative, Plastics Division, Monsanto Chemical Co., Springfield, Mass.**

USE OF MOLDED PLASTIC food packages has more than tripled in the past five years.

And as self-service merchandising grows, this greater utilization is expected to continue.

**▶ Thus, it is important that food processors understand the properties and engineering requirements of the materials available.**

Two major considerations govern selection and use of plastic containers: **End-use requirements and design factors.**

The end-use of the package necessarily demands that certain basic properties be inherent in the material.

For example, a "squeeze" bottle's material must be flexible, and for a food container it must be non-toxic and have a low moisture-vapor transfer rate.

Each application requires and makes use of particular characteristics of the plastic material itself. When these requirements have not been adequately filled by existing materials, new improved resins have been developed.

Thermoplastic molding compounds like styrene and polyethylene always have fitted readily into the food packaging market. Even here, however, high strength needed in some applications caused development of a special high-impact styrene resin and a high-density polyethylene.

Engineering requirements to be considered in selecting a material to be injection molded into stock containers are:

- Ease of conversion (fabrication)
- Rigidity or flexibility
- Toughness and strength
- Dimensional stability
- Lack of moisture absorption
- Non-toxicity
- Transparency or color
- Chemical resistance
- Cost

**CAPABILITIES** of polyethylene and high-impact and general-purpose styrene are contrasted.

Both styrene (a rigid material after molding) and polyethylene (a flexible plastic in its finished form) meet these requirements in most packaging applications.

Styrene plastic resins of varied characteristics are now available to packagers. Two types are of major importance: (1) General purpose styrene, a clear material made from polymerization of styrene monomer (ethyl benzene); high-impact styrene, a naturally translucent compound, a copolymer of styrene and butadiene.

Addition of rubber in the manufacture of the resin improves the strength properties.

Polyethylene plastic resins are made by polymerizing ethylene gas into a translucent material boasting toughness and excellent low temperature properties. Newest resins being made by modifications of the basic polymerization processes are developing a higher degree of transparency.

As may be seen from the graph, polyethylene has the lowest rate of MVT. For this reason polyethylene makes an excellent package where it is necessary to provide a barrier to contained moisture in order to maintain "freshness" of prepackaged foods.

Both styrene and polyethylene have relatively high rates of gaseous permeability. That is, they both readily permit the passage of gas through their molecular structure. For this reason neither polyethylene nor styrene is suitable for packaging a carbonated beverage, such as ginger ale. If such a plastic, having a high gaseous diffusion rate, is used, the carbon dioxide dissipates by passing through the walls of the plastic con-

tainer. The remaining liquid is flat and unpleasant tasting.

### Designing the Container

The geometry of the finished container determines to a great extent whether the package will be rigid, semi-rigid, or flexible.

A material very hard and rigid in mass may be quite flexible in thin section. The geometrical construction then made of this section further affects the rigidity.

A very thin-walled container, approximately 0.018 in. thick, made of an inherently rigid material such as high-impact styrene, can be made flexible or stiff, depending upon the design given to the top edge rim characteristics.

In the diagram, a top bead projecting out around the container imparts rigidity by resisting compression flex. A top bead rolled over, rather than projecting out, permits flexibility of the sidewalls. In this case, the sidewalls may be flexed almost to the point of touching each other.

Thus, although end-use of the container determines whether it should be rigid or flexible, proper design permits the use of the same material for either form.

In a thick-walled container (0.020-0.040 in.), both general purpose styrene and high-impact styrene provide a rigid package. In the design shown, however, polyethylene provides a very flexible package—almost too flexible for most applications.

In order to overcome this excessive softness, the design may be changed from circular to rectangular form. This usually imparts enough rigidity to the container for most uses.

The rectangular shape also has the advantages of economy of space on shelf storage and on packing of the filled containers for shipment.

Polyethylene and high-impact styrene are used for container lids where high tensile elongation is required. This permits undercuts to be molded in for tight slip-over fits of cover to container. Without undercut design in the lid, fit is apt to be loose and unsatisfactory.

An advantage of styrene over polyethylene for lids is of importance here. Polyethylene requires pretreatment of the surface (by oxidation) if permanent adhesion of printing or descriptive design on the lid is desired. Unless surface is treated prior to printing, ink adhesion is apt to be so low that normal abrasion will remove a sales message or trademark. Styrene requires no pre-treatment of container surface for permanent ink adhesion.

Styrene and polyethylene have been notable in filling plastic packaging requirements. Continued research is bringing forth new plastic materials and increasing the efficiency of existing ones. Both high-impact strength and high clarity are now a reality in styrene and polyethylene containers—whereas only a short time ago the food industry had to settle for just one or the other.

### How Much Will It Cost?

Any material selected must be capable of economic conversion into the finished product. This is dictated by the mass-volume market in which it is used.

Both styrene and polyethylene are easily converted by the injection molding process, a means of producing multiple units with great rapidity and a minimum of labor. Complete fabrication of a finished container can be accomplished automatically in 4-6 sec.

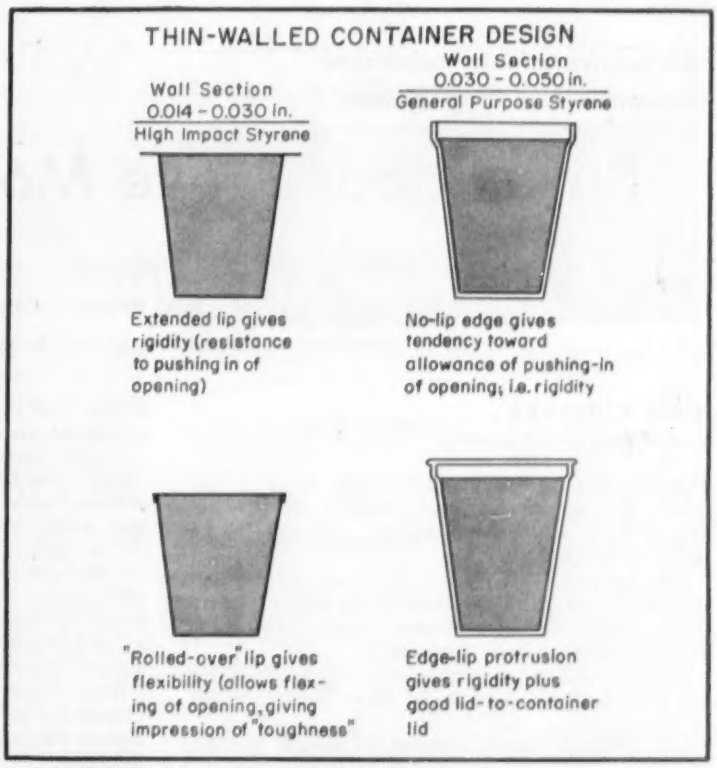
This ease of conversion has a natural effect upon container cost. Where the basic raw-material cost of styrene and polyethylene is above that of other materials being considered, this low cost of conversion often more than compensates for it. So both factors should be considered simultaneously when selecting a suitable base material.

Certain physical properties must be inherent in the materials chosen for a particular packaging application. These properties are the bases for the engineering requirements previously stated.

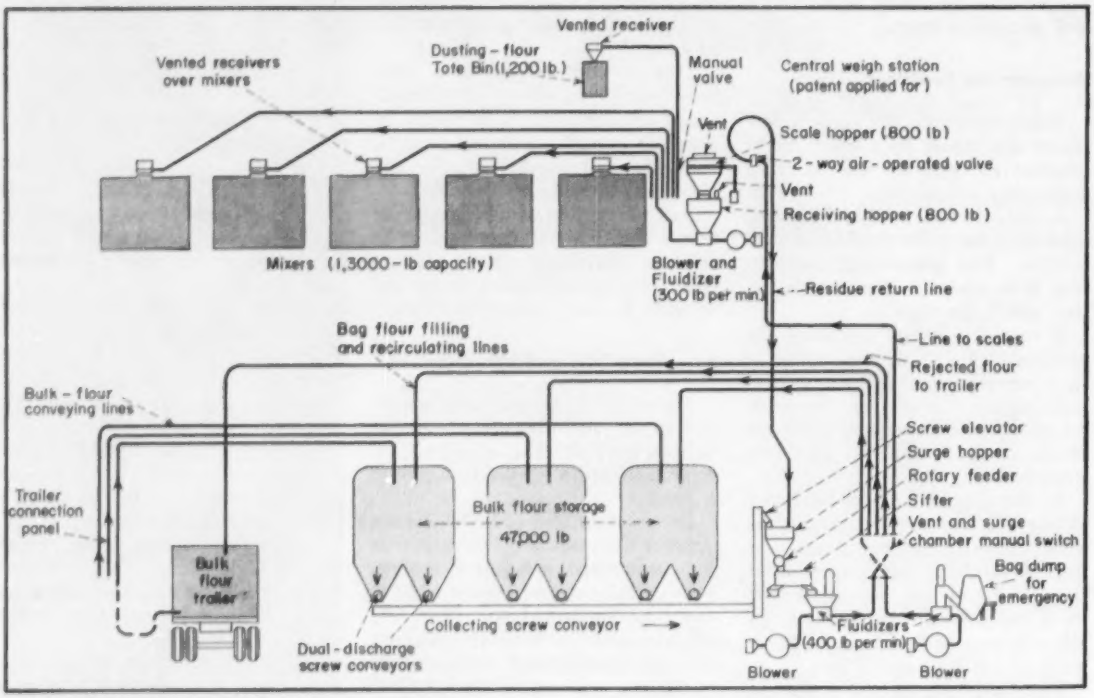
Rigidity or flexibility is measured by the modulus of elasticity. The toughness and strength is determined by tensile and impact strength tests. Properties of dimensional stability, moisture absorption, toxicity, and chemical resistance may be measured directly by the technician. All these properties define the use to which a packaging medium may be put.

Styrene and polyethylene being the two high-volume, packaging plastics, we will look briefly at their respective physical properties to see what makes them so.

Styrene, being a more rigid material than polyethylene, shows a higher modulus of elasticity, a higher tensile strength, and a higher flexural strength. (Turn to page 188)


THIN-WALLED CONTAINER DESIGN
Wall Section
0.014 - 0.030 in.
High Impact Styrene
Wall Section
0.030 - 0.050 in.
General Purpose Styrene
Extended lip gives rigidity (resistance to pushing in of opening)
No-lip edge gives tendency toward allowance of pushing-in of opening; i.e. rigidity
"Rolled-over" lip gives flexibility (allows flexing of opening, giving impression of "toughness"
Edge-lip protrusion gives rigidity plus good lid-to-container lid

**HOW DESIGN** affects rigidity of molded plastic container.




HIGH-PERFORMANCE Fluidizer handling of flour at Weston bread bakery is shown step-by-step. Flour is pneumatically unloaded from trailers into storage bins, from which screw conveyors and bucket elevator transfer it to surge hopper. It continues through sifter and into Fluidizer that delivers it into scale hopper. Another of new units moves scaled flour into five mixers, or into Tote Bin servicing flour-dusting operations on make-up floor.

***"Air-lubricated" in advanced pneumatic handling system,***

# Bulk Goods Move More Efficiently

**New unit "air-films" particles to make them flow like fluid through smaller diameter lines at high solids-to-air ratios and low velocities . . . Advantages and broad applications cited**

**JOHN V. ZIEMBA**
Associate Editor, "Food Engineering"

THERE HAS BEEN PARTICULAR focus on improved handling of granulated products–the principal reasons being mounting operation costs and stricter sanitation standards.

This has stimulated a broad movement to gain new efficiency. And in the course of it, the values of pneumatic systems–better sanitation, space saving, and many others–have been recognized.

And now comes an even newer system employing the Fluidizer*, designed to be even "tighter on the target."

**• This method, already adopted by several branches of the food industry, delivers dry powders and finely granulated materials encased in a thin film of air.**

**In this condition, particles are separated and "lubricated," thus facilitating their movement. And when sufficient push–in the form of air pressure–is applied, they readily flow through a pipe, hose, or tube.**

The makers of the system directed a special eye to the conventional demands for high power, air volume, and velocity. Their aim was to trim such factors, as evidenced in this brief of advantages–

**• Cited as lower: Initial and installation costs, operating and maintenance charges, power consumption, air volume, dusting (no cyclone or filter-collector needed), velocity in conveyor line, and product attrition. Termed higher: Efficiency, capacity, degree of sanitation, and flexibility.**

In this system, particles are moved at solids-to-

* Registered trade name for equipment and system developed by Superior Separator Co., Hopkins, Minn.

air ratios as high as 200 to 1, and at only 5-ft.-per-sec. velocities.

In a test conducted by Superior, for example, flour was conveyed 25 ft. through a 1¼-in. dia. tube at a rate of 100 lb. per min. Total power consumption was 3 hp., with a solids-to-air ratio of 125 to 1.

Corn meal handles well as velocities below 750 fpm. The same is true with oat flour. However, in actual installations, it might be advisable to increase these velocities by 100 or 200 fpm.

Other products that can be handled are bran, wheat flour, "shorts," semolina, farina, soy flour, graham flour, cake mixes, cocoa powder, coffee chaff, powdered eggs, milk solids, gluten meal, soluble coffee, powdered cream, salt, starch, and sugar.

Design features are important. For one thing, speed of valve rotor has a great effect on optimum solids-to-air ratio. Clearance of valve rotor in housing must be kept to a minimum, except for products like sugar. Size of conveying line is directly related to performance, and is keyed to air supply and the system's valve. Also, correct air volume and pressure are essential for desired results.

#### What It Comprises

Basically, the system consists of a valve, source of compressed air, and conveying line of such length as is necessary. Air can be tapped from a plant source, but use of an independent blower for each system gives best results.

Accessory blower equipment includes driving motor, inlet air-filter silencer, pressure gage, check valve and, in certain applications, a variable-speed drive for the motor.

Unless proper valve speed has been determined on a test unit, it may be necessary to try different rotational speeds.

Smooth bore of tubing and fittings minimizes friction. Conveying pipe is grounded by pipe hangers because of static electricity produced by friction from flow of solids.

Bore size of tubing matches size and capacity of valve to attain desired 900-to-1,200-fpm. conveying velocity when system operates most efficiently.

Velocities are excessive and maximum capacity not achieved when the tubing is too small. On the other hand, too large a tube may cause velocity to drop to the point where a plug-up is likely to occur. Or the solids-air ratio falls so that there no longer is proper action on the particles.

It is common to use 2-stage blowers when a single stage does not develop necessary pressure for desired length of run. Sometimes, two Fluidizers may be operated in parallel for greater capacity.

When feeding to more than one spot, a 2-way diverting valve can be used for automatic or manual control. Likewise, a special distributing tube can be employed to fill a long bin.

Electrical controls range from two interlocked off-on switches, for a small simple-packaged unit, to a complex arrangement for remote control of a several-stage, multiple-bin filling system. Feed control and blower control are electrically interlocked. Thus, the blower runs before the feed starts. Interlocking switches are necessary on longer conveying distances or when purging the line in the event of short runs and before shutting off the system.

After material starts to discharge in a fairly even stream from the end of the line, blower speed can be cut back to give desired operating conditions for systems provided with a control. Useful is a cable-connected tachometer from the blower shaft to indicate speeds.

#### More About Blowing Control

In the average single-stage system, blower does not operate continuously at a pressure exceeding 13 psi. A 2-stage system utilizing two blowers does not operate continuously at a pressure over 26 psi. Customary distances are 100 ft. for a single-stage system and 300 ft. for a double-stage one.

A pressure gage installed on each Fluidizer indicates (1) performance of blowers; (2) proper pressure where more than one product may be handled, possibly requiring a different pressure for optimum performance; or (3) a plugged line.

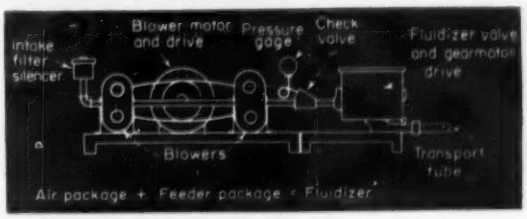
Tachometers installed on all systems utilize a variable-speed motor or drive. Each has a pair of static pointers that can be pre-set to indicate a dangerously high or low blower rpm. and to provide immediate visual indication that the blower speed and, consequently, pressure delivered, is in accordance with requirements of the system. This instrument, used in conjunction with pressure gage, also determines blower performance.

A check valve protects blowers from jamming in event of mishap, such as power failure.

#### Operating Details

If blower speed and, consequently, amount of air supply is cut back, the system delivers at progressively higher solids-to-air ratios. But this will not necessarily give the highest rate of solids flow. In short, it is seldom

## Fluidizer's Key Operating Factors




**SYSTEM** consists of blower, feeder, rotor valve, and 2-in.-dia. pipeline or tubing. Working factors follow—

| | |
|---|---|
| Solids-to-air ratio (by weight) | 75-1 to 200-1 |
| Velocity in line | 600 to 1,000 fpm. |
| Hp. per ton per hr. | 0.8 to 2.5 |
| Conveying line size | 1 to 4 in. |
| Operating pressure | 5 to 20 psi. |
| Heat transfer, metal-to-air, or vice versa | Insignificant |
| Moisture transfer, metal-to-air, or vice versa | Insignificant |
| Pressure system | Yes |
| Suction system | No |
| Collector required | No |
| Bends | Not critical |
| Abrasion of pipeline | Not a problem |
| Attrition of product | Not a problem |

that a system operates at its highest potential ratio.

If air is cut back too far, a line plug-up occurs. This is evident by rapid dwindling of solids flow from end of line, together with an increase in pressure (indicated on gage). Rapid supply of more air, together with momentarily shutting off the feeder, often clears the line.

If complete plug-up occurs, the gage will indicate maximum pressure the blower can deliver, but there will be no solids flow from the line. It is then necessary to disconnect each length of pipe and clean it out.

For best all-around performance, it is necessary to match quantity of motive air and feed rate. If valve rotor speed is too high, it causes plugging or inefficient action. Should the speed be too slow for amount of air used, flow is uneven and dusting excessive.

When material discharges from line in intermittent slugs, it is often an indication of insufficient air or pressure, presuming rotor speed is correct. It is also an indication of excessive air when handling sticky materials, such as high-shortening cake mixes.

Housing of the unit is cast of ductile iron that has been completely stress-relieved and then heat-treated to a minimum tensile strength of 100,000 psi. All interior valve surfaces are polished, hard chrome plating. Object is to provide a housing with smooth, hard, wear-resistant surfaces and free of all casting and machining stresses.

#### Precision-Built

Rotor is cast of a hard, tough bearing bronze and is precisely machined. It has also been provided with adjustable tips of the same material. In addition, it is floated axially on the shaft with movable wear plate applying pressure to hold it against the fixed-end cap.

Rotor of unit's valve is tipped with adjustable, specially constructed bronze, pre-set for proper clearance for most efficient handling of the product. However, in event it is desirable to run a different product, these tips are easily reset by manually rotating the valve rotor to a point where each can be reached at the feed area.

## Flour Handling in Trail-Blazing Bakery

For a number of pertinent reasons, Fluidizers have been installed to bulk-move flour at the bread bakery of Weston Bakeries Ltd., Toronto. The system was put in by the Fred D. Pfening Co., Columbus, Ohio.

Here are four of the reasons cited for its selection:

1. Elimination of dust-collecting equipment, like separators, cyclones, residue return lines, automatic valving, etc.
2. Reduction in maintenance costs.
3. Adoption of smaller diameter pipelines.
4. Employment of much less air per unit of flour.

#### Filling Bins

Let's now follow bulk movement of flour through this large Weston bakery:

First off, flour is bulk-shipped from the mill in a 36,000-lb.-capacity Airslide trailer. A self-contained unit in trailer pneumatically unloads flour into one of three double bottom-hopper horizontal, metal, 47,000-lb. storage bins at 20-ton-per-hr.

Unit comprises a 20-hp. 2,000 cfm. blower, 1½-hp. feeder discharging flour from 5-hp. motor-driven Fuller Airslide into air line beyond blower, and a 3-in. dia. flexible hose hooked to a pushbutton control panel located on outside wall of bakery. Panel is partially supplied with power from the trailer. It can be locked and opened any time, even when the bakery is not operating.

Panel consists of tube connections for storage bins, a return line to trailer, signal horn and lights hooked to high-level indicator, pushbutton to silence horn, and power connection.

Operator unloads trailer by first plugging in electric power and connecting flexible hose with one of the pipeline fittings in the panel. Three are pipe-connected to storage bins, and the other is hooked up for returning any rejected flour to trailer.

As hose is hooked up, a limit switch is activated to automatically select circuit in plant system tying in with a Textor high-level bin indicator (Robertshaw-Fulton Controls Co., Fielden Instrument Div., Phila.).

Level detector has no moving parts—only an electronic tube. As flour level rises, capacitance at Teflon-insulated, stainless steel probe (¼x4 in.), changes and energizes a relay. Unit then flashes a warning (full-bin signal), and operates a control that keeps level of flour from exceeding desired limit.

Flexibility has been engineered into the new method through installation of facilities to handle bagged flour. It is designed for such flours as rye, whole wheat, etc., that are not moved in bulk, as well as regular, pallet-stored flour for emergency use.

This 2-stage unit replaces the conventional one employing a series of horizontal and vertical worm-screw conveyors. Rate of this second Fluidizer is also 400 lb. per min.

Steps in starting and stopping system:

Air is blown into the metal conveying tubing to purge line before discharging flour into feeder. Flow of air and flour blown into the system keeps pipeline clean.

When system is shut down, procedure is reversed. Feeder is cut off through a time-delay switch, and blower continues to operate a few seconds to purge the line.

Now to some interesting features—sanitation, controlled blending, and safety—built into the horizontal storage bins.

As for sanitation, dual worm-screw conveyors discharging flour from double-bottom hopper of each bin are snug-fitted with removable, hard Neoprene gasket-sealed covers to permit easy access for cleaning. Covers hinged on one side are easily and quickly secured and removed by hand clamps on the opposite side.

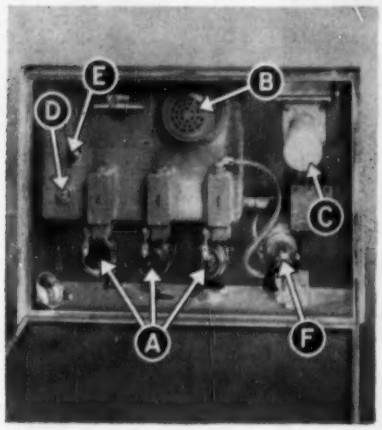
Metal bins are totally free from crevices, internal joints, etc., to avoid lodging of flour and possible subsequent insect contamination. And there is an inspection port on top of each bin.

#### Controlled Blending

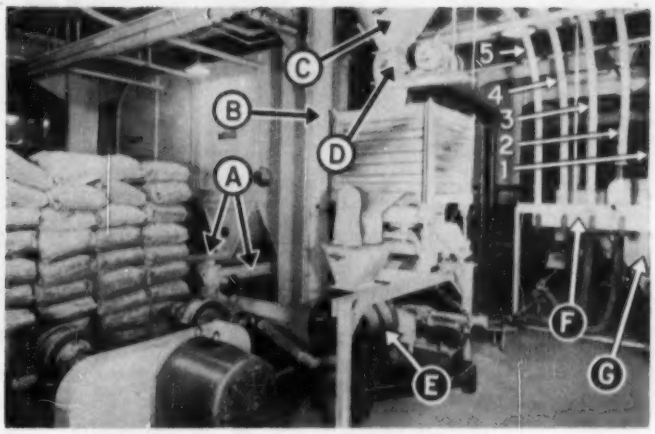
Flour blending (from two bins to a third, or directly via scale hopper) is remotely controlled from a central scaling panel (patent applied for).

To serve as an arch breaker and to assure steady flow into dual discharge scrolls feeding a ¼x6-ft. col-

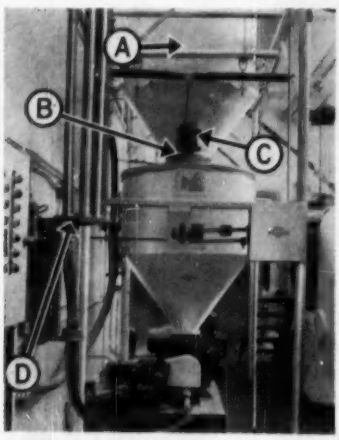
## From Receiving Dock to Dough Mixers

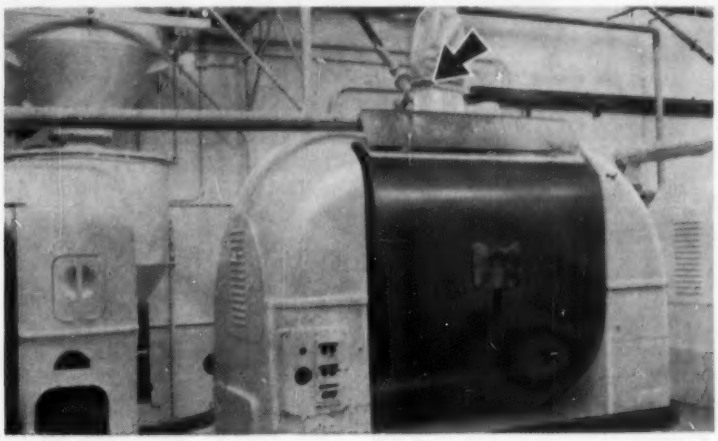



**TRAILER CONNECTION** panel includes three tube hookups (A) to storage bins, signal horn (B), power connection (C), signal light (D), horn pushbutton (E), and line for returning any flour that might be rejected to trailer (F).




**IN MOVEMENT** of flour from double-hopper bottom storage bins (rear), twin screws (A) discharge into collecting screw which feeds screw elevator (B). This lifts it to surge hopper (C) for discharge into rotary feeder (D). Flour continues through sifter into feeder serving Fluidizer (E). Blower (left) helps move it to switching station (F), where it may be sent into any one of five different feed lines (as numbered on photo). Note bag dump (G).



**OPERATIONS STEPWISE.** Left photo: Via central control panel, flour is sent by Fluidizer from manual switching station to scale hopper (A). It is pushbutton-dumped through air-operated discharged valve (B), with aid of vibrator (C), into receiving hopper below. Fluidizer feeds scale flour to manual switching station (D) for delivery to either of five mixers or dusting-flour Tote Bin. Right photo: Over mixer is special line-feed adapter (arrow) that replaces conventional rail-traveling flour-scale hoppers.

lecting screw, paddle-type agitator arms have been installed in each bin hopper. Agitators and double-discharge screw are remotely controlled through a 5-hp. variable-speed motor (one for each bin system).

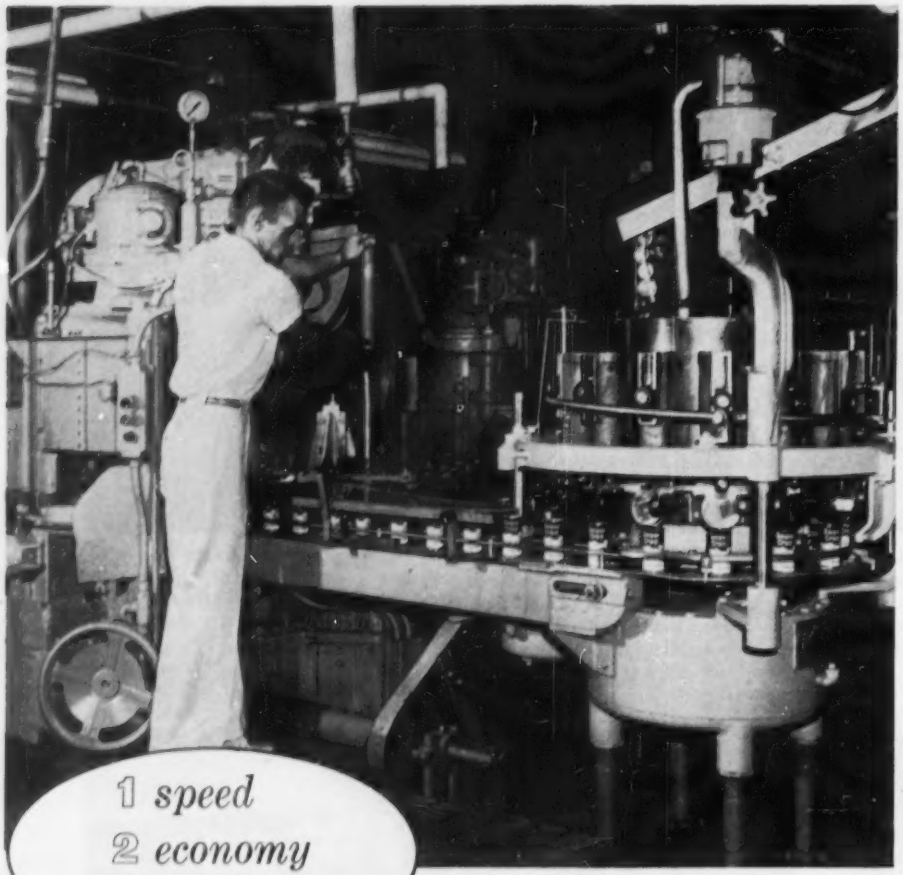
Blending is controlled through speed-indicating (% maximum rpm.) tachometers hooked to discharge-screw motors. Dual-screw conveyors running at maximum speed (100% on indicating tachometer), pull flour from a storage bin at 400 lb. per min.

Blending is achieved by pressing "high" or "low" pushbuttons below tachometers. Pre-set amounts of flour are then delivered from two or three bins to make a blend. Speed of discharge screws, in this case, are reduced through automatic controllers.

For example, two bins might be set up to continuously deliver a 40-60% flour blend to either scale hopper or third bin. Or a 20-40-40% blend from three bins can be moved to scale hopper.

Overloading is prevented by a safety device installed in the 2-hp. motor-driven screw conveyor (4x28 ft.) collecting flour from dual-discharge screws. Should load in this collecting conveyor exceed 400 lb. per min., a pressure safety switch cuts off dual-discharge screw motors, sounds a warning horn, and flashes a red signal light. System must be manually started when collecting conveyor begins carying a safe load.

From collecting screw, flour is elevated 12 ft. through a vertical, 9-in.-dia. screw and into a 500-lb. capacity



1 *speed*
2 *economy*
3 *accuracy*

# How to put ALL 3 into your food packaging

If you're packaging a *viscous* or *semi-solid* product, Pfaudler piston fillers can help you do it more quickly, more economically, and with greater accuracy. Here's why!

**Speed.** You just can't get the same filling action from any other piston filler. Pfaudler's *patented* two-port rotable valve, automatic take-up, and cam control give you filling speeds up to 1000 containers per minute! Speed depends, of course, on filler model, container size, and the fluidity of product.

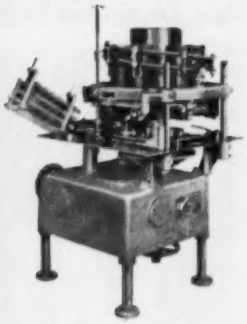
**Economy.** Savings come to you in many ways. Take cleaning, for example—the exclusive one-piece valves slide right out and the simple *ring-free* pistons lift out. One man can perform the entire cleaning operation in less than a half hour. So, your operating expenses go down. And maintenance costs go down, too. Pfaudler fillers have but four primary wearing parts—each one durable, easy to install, and *low in cost.*

**Accuracy.** The closer you control fill, the easier it is to keep costs in line. Pfaudler piston fillers assure accurate filling. In fact, for stated applications, they're guaranteed to fill within specified tolerances — *usually* within ± 1/10 ounce.

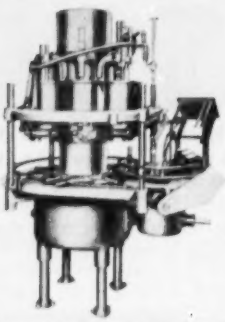
You can put all three of these benefits into *your* food packaging with one of the five available models. To find out which model best suits your product, contact your Pfaudler representative.

Or drop us a line. Just ask for Bulletins 911 and 911-S.

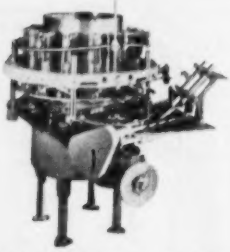
**Five standard models of Pfaudler rotary piston fillers**



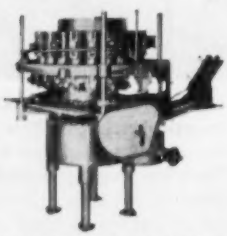
Model RP-6 Six Stations



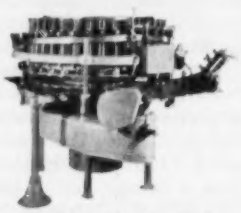
Model RP-7 Seven Stations



Model RP-14 Fourteen Stations



Model RP-21 Twenty-one Stations



Model RP-35 Thirty-five Stations

**THE PFAUDLER CO.** **ROCHESTER 3, N.Y.**

surge hopper. In event hopper is overloaded, warning horn on central panel sounds.

Flour is now gravity fed through a rotary feeder that delivers a steady, uniform flow via a short, 6-in.-dia. nylon sock to a 5-screen, gyrating sifter. Through another short nylon sock, flour drops into feeder portion of the second Fluidizer—a 2-stagger delivering it 194 ft. from basement to 4th floor.

This vented unit picks up the flour, and Fluidizer handles it before delivery—at 400-lb.-per-min.—through a 3-in.-dia. metal pipeline terminating at a manual switching station. Here, the two incoming lines come from flour dump and storage bins. Of the five discharge tubings, three return flour to storage bins, one can reject it into trailer, and the other delivers it to a conical, 800-lb.-capacity scale hopper (near central scaling-control panel).

Lucite sight-glasses installed throughout the tubing permit operators to check flour in flow.

#### Top-Efficient Scaling

Automatic movement of flour to scale hopper and weighing, then Fluidizer-conveying to five vented, 1,300-lb. capacity dough mixers, are also controlled from the central-scaling panel.

Pre-set amount (on scale beam) of flour is weighed into scale-suspended hopper. When scale comes to weight, an automatic, 2-way, air-operated valve returns excess flour to surge hopper above sifter as line is purged. Operators then presses a pushbutton to discharge weighed flour from scale hopper to a conical, vented receiving hopper having an 800-lb. capacity.

Syntron vibrator at the bottom of the scale hopper operates simultaneously with air-operated valve to assure full delivery of flour into receiving hopper.

As scale hopper's discharge valve closes, another batch is weighed into hopper by a pushbutton-starting the Fluidizer. At the same time, flour in receiving hopper drops into a third Fluidizer that feeds it at 300 lb. per min. through 2½-in.-dia. tubing to a Tote Bin (flour for dusting) or to one of the five dough mixers. Delivery is through a 1x6 manual switching station.

The permanently located Tote Bin in make-up department assures foolproof inventory of dusting flour. As needed, flour can be automatically scaled into it in any desired amounts. And it is withdrawn by scoop for dusting the dough dividers, rounders, molders, and overhead proofers.

#### Scaling Benefits

The present, permanently fixed scale hopper replaces the former five 'rail-traveling ones (400- and 800-lb. capacities). Also abolished are overhead rails, beams, scale mechanisms, electrical controls and power for moving scale hoppers, and need for a lot of head-space above mixers.

Being completely closed, the scaling system is more sanitary. Also, it's more accurate. One instead of several operators weigh the flour. Errors in scaling can, this way, be pinpointed. And because of the new precision, bread quality is more uniform and ingredient savings are attained.

## Handles Wide Variety of Mix and Cereal Ingredients

Careful preliminary planning—taking into account the needs of production and engineering departments—has resulted in an unusually versatile Fluidizer system for bulk-handling materials in-process at the new General Mills, Inc., breakfast cereal plant, Toledo, Ohio.

Selected were seven Fluidizers—two for cake mix ingredients, and five for puffed cereal lines.

Primary reasons for choosing these units were that they fit into the company's modernization program, stress improved sanitation, and enable fully continuous processing and more efficient production.

Bulk handling of milk solids and cocoa powder with two of the units, each fed by a 2-stage blower, has been perked up in this manner:

Ingredients are emptied from 100-lb. bags into 500-lb. capacity bins. They then drop into 3-ft., 6-in. dia., horizontal screw conveyors feeding the units. Blowers put air into both units at 70 cfm.

Milk solids and cocoa powder are separately air-conveyed at a rate of 200 lb. per min. through 20-ft. vertical pipes (2-in. dia.) into 1,000-lb. capacity blend-

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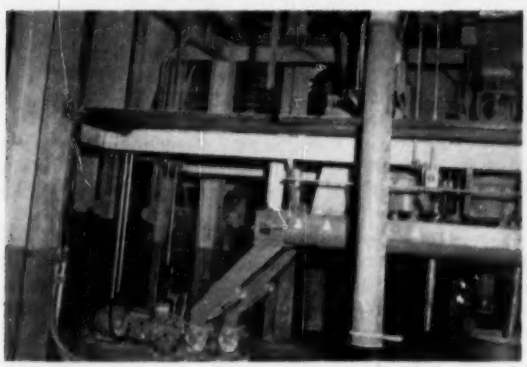
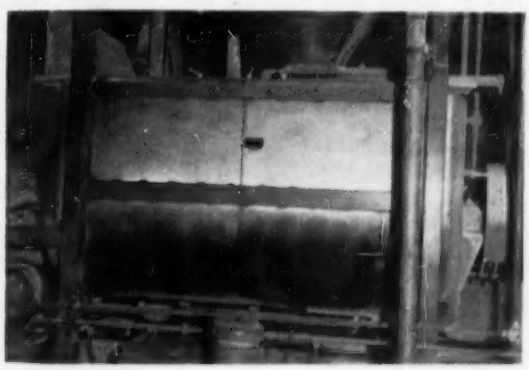


**ON CEREAL LINE,** Fluidizers (left) deliver oat flour and corn cones from screw conveyors into pipelines going to blending and then processing.



**INGREDIENTS** to make mix for cereal line are scaled in hopper (top), then discharged into batch mixer. Fluidizer then conveys mix to holding bins.

ing bins. Each bin is equipped with rotary-type pressure-sensitive level indicators.

**Puffed Cereal Line**

As for the five units handling materials on the continuous puffed cereal line, the roll of each will be noted in the following run-down:

Oat flour and corn cones are received in 100,000-lb. capacity Airslide hopper cars. Direct unloading through 100-ft., 8-in. dia. pipe-lines into 230,000-lb. capacity in-plant silos is accomplished by Airslide action and Fuller Airveyors.

Both ingredients are then handled in separate systems. They drop into double screw-feeders supplying scalpers and then into Fluidizers (two) equipped with 900 rpm., 108 cfm. blowers. Then they are carried through 2-in. dia. pipes (15-ft. horizontally and 85 ft. vertically) at 100 lb. per min.

Each continues 15 ft. through 2-in. dia., reinforced, flexible Neoprene lines and then an 8-in. flanged opening (foam rubber gasket-sealed) above 70,000-lb. capacity blending bins. Merchen scale feeders (Wallace & Tiernan) control flow into either of two continuous mixing-type screw conveyors (9-in. dia. and 20 ft. long). Each is for preparation of a different cereal product.

Other ingredients are hopper-fed into a 3,000-lb. batch-type ribbon mixer, from which the blend is gravity discharged into a third Fluidizer with a 2-stage blower. Blend is then conveyed at 400 lb. per min. through a 145-ft., 3-in. dia. tube feeding 15,000-lb. capacity blending bins. A Merchen scale-feeder delivers weighed amounts into the mixing screw conveyor.

A 4th and 5th Fluidizers on this line, equipped with 1,750-rpm. blowers, carry blend at 65-lb.-per-min. through 1½-in. dia. pipes to a Redler distributing conveyor, discharging to processing.

*For their assistance in collecting materials and photos for this article, the author makes particular acknowledgment to: Marshall Carpenter, Superior Separator Co., Hopkins, Minn.; E. M. Bellamy, Weston Bakeries Ltd., Toronto; H. Tombers and Robert Braeden, General Mills, Inc., Toledo, Ohio; and T. F. Ronson and Charles Lane, The Fred D. Pfening Co., Columbus, Ohio.*

# Practical 4-Step Approach For Getting Special Machines

**Trend—particularly in packaging equipment—is to higher and higher speeds. And this is just one of the reasons for putting new realistic foresight into your procurement policy**

**FE STAFF**

**WHEN YOU NEED special-purpose equipment, what's essential in procuring it? . . . Should your own company do the designing? Or should it, instead, call on outside experts to plan and shape the new unit? . . . And when should foreign units be specified instead of domestic?**

These questions loom large in this era of high-speed machinery.

Take the rise of completely integrated packaging lines. It's believed all major packaging will soon be handled on such lines. And certainly, procurement policies should be abreast of such trends.

This puts the spotlight on General Foods Corp.'s four-phase method, as outlined at American Management Assn.'s Machinery Conference by George M. Woodruff, manager of GFC's Machine Development Section—

**1. In all cases, GFC initially endeavors to buy commercially-available equipment (keeping in mind reasonable capital investment and efficient use of both labor and materials.**

**2. If none is found suitable, the company endeavors to have the maker alter available equipment to adapt it to the special needs.**

**3. Failing this, the company employs a design firm to complete the special machine requirements (or the initially approached maker may work through such a third party to have the needed equipment made).**

**4. Finally, the company itself may design and develop the equipment if it can't be procured by the other methods.**

Now to GFC's pattern in selecting commercially-available or alterable equipment:

First comes analysis of requirements. Relative to a packaging operation, this includes carton size, liners, overwraps, and any special features. And next determined are the machinery requirements—speed, type of fill (gravity or volumetric), check weighing, space available, caliber of operating personnel, and delivery date required.

Domestic manufacturers are contacted first. Subsequently, foreign manufacturers may be considered, but only after domestic sources have been combed. Then follows an analysis of machines available and final selection.

Whether a special machine is built by the company's own staff or by outside design talent, this is the procedure:

First, analysis of requirements, both known and unknown operations. Second, modeling and proving-out of unknown components. In this

(*Turn to page 168*)

**IMPORTANCE OF SHARP FORESIGHT in procurement is reflected in GFC's belief that its packaging people will shortly capitalize on the new coated or specially treated carton boards. Thus, liners may be eliminated in some packages—further speeding operations.**

**Meanwhile, it's still not clear how high the speeds can go with continuous-motion machines. But GFC studies do indicate that 500-cartons-a-minute should be reached fairly soon.**

**Accordingly, the company has a "future sight" on 1,000-cartons-a-minute, believing that the next five years will reveal a pattern for achieving it.**

*New markets open, old ones expand, as*

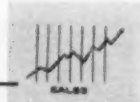
# Mother Nature gets a big assist from Pro-80 Vital Gluten

Mother Nature and modern food processing methods have done wonders to provide healthful, tasty foods.

But many times these foods do not contain enough protein to satisfy increasing numbers of health and diet conscious consumers. That's where Pro-80 Vital Gluten steps in! Added to these foods, Pro-80 raises protein content to satisfy consumer wants, to create new markets, new profits for food processors. It merits your investigation—right now!

*10 quick questions and answers to help you understand the importance of protein enrichment with Pro-80 Vital Gluten*

**WHY SHOULD I CONSIDER PROTEIN ENRICHMENT FOR MY FOODS?**




To keep your products attune to public demand. Customers' wants have changed in recent years. They are more weight, health and diet conscious—They seek protein-rich foods. Foods fortified with Pro-80 can help satisfy their needs—give you premium products that mean new interest in your line, an important "difference" to promote.

**WHAT IS PRO-80?**

Pro-80, a natural product developed through research, is General Mills' high-protein vital wheat gluten: 80+% protein on a moisture-free basis.

**HOW IS IT MADE?**

Pro-80 is made from wheat flour by washing out the starch and drying the gluten in vacuum ovens at low temperature. Thus its vital characteristics are preserved. When reconstituted with water, Pro-80 regains its resilient elasticity.

**WHAT DOES PRO-80 LOOK LIKE?**

Pro-80 is a creamy-tan, dry powder, is easily handled and stored. Standard package is a 100-lb. bag.

**HOW DO YOU USE PRO-80?**

Simply mix Pro-80 with other dry ingredients during processing. It is bland, compatible with other foods, adds no taste or odor of its own—hydrates rapidly, blends smoothly.

**WHAT FOODS ARE EASILY ENRICHED WITH PRO-80?**

Scores of them. Among the most popular are:

breads, baked goods, macaroni products, canned specialties, health foods, cereals, baby foods, medicinal wafers

**WHO BENEFITS FROM PROTEIN FOODS?**

Everyone. Protein foods build and maintain good health. High protein diets are especially recommended for weight reduction, during illness, surgery and pregnancy.

**HOW DOES THE BODY PUT PROTEIN TO USE?**

The body uses protein to build muscle, to replace tissues and to keep them healthy. Protein makes enzymes to aid digestion, builds antibodies and is part of the hemoglobin.

**HOW DOES PRO-80 IMPROVE FOODS?**

By increasing protein content without disturbing other characteristics. Protein ration can be easily adjusted by merely adding specified amounts of Pro-80. In a addition, it improves cohesiveness, often improves flavor, bite and tolerance.

**WHAT DOES IT COST TO ENRICH FOODS WITH PRO-80?**

Relatively little. For example, if your foods now contain as little as 7¼ per cent protein, you can increase protein content to more than 11 per cent with Pro-80 for only 1½ cents per pound of finished product.

*NEW BOOKLET TELLS MORE*
Write today. Special Commodities Division of General Mills, Minneapolis 1, Minnesota.

*Pro-80 Vital Gluten is made only by*

**SPECIAL COMMODITIES DIVISION**

General Mills

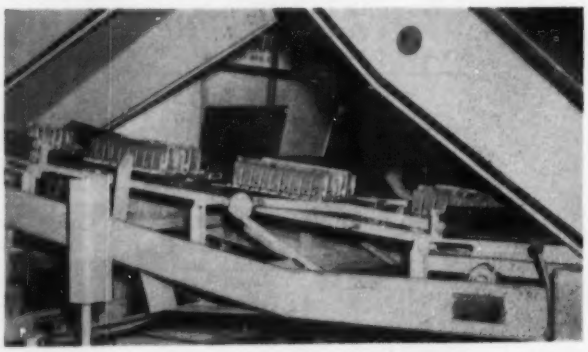


For more data, circle this page number on card at back →

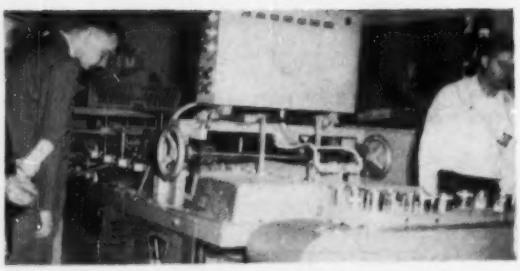
# Latest Units for Packing, Cleaning, Processing, and Refrigerating

**—are displayed at MBAA Brewery Industries Exposition in Chicago, and here FE spotlights 29 of them. Included are new fillers, air sterilizers, clarifiers, $CO_2$ systems, and separating, blending and pumping equipment**

## PACKERS, CASERS, FILLERS



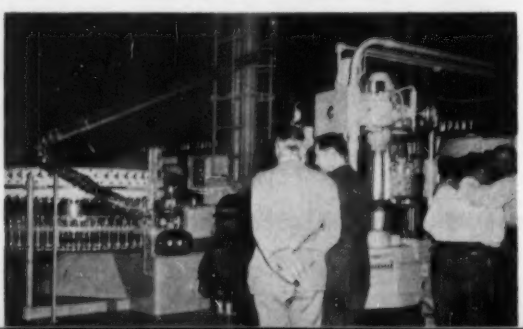
**HIGH-SPEED UNCASER** handles up to 900 bottles per min. Gently acting, it takes most standard cases and 6 to 32-oz. bottles. Changeover to different size bottles takes less than 15 min. Exhibitor: Radio Corp. of America, Camden, N. J. (86A)



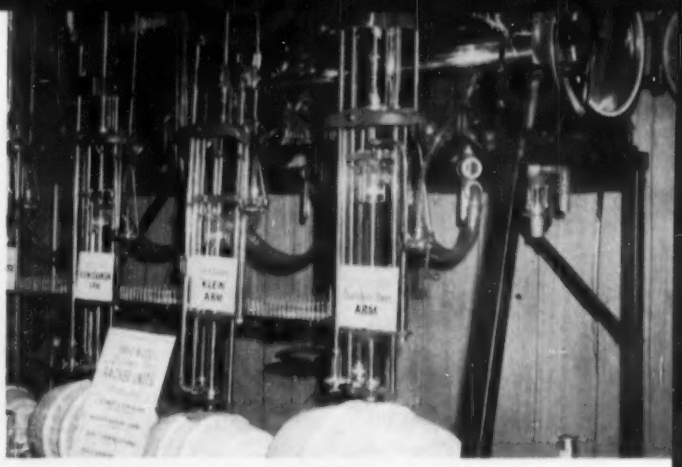
**600 CANS/MIN.** can be run on this compact six-can packer. It handles packs with or without top-tab locks or handle. Features special vacuum carton feed, safety devices, adjustable and timed compression unit, and synchronized drive for can-carton registration.—Dacam Corp., Charlotte, N. C. (86C)

**AUTOMATIC CASE CLEANER** removes debris from returned cases. Unit inverts, air blasts, vibrates, and delivers (right-side up) at 26-cases-a-min.—Mangel, Scheuermann & Oeters, Philadelphia. (86B)

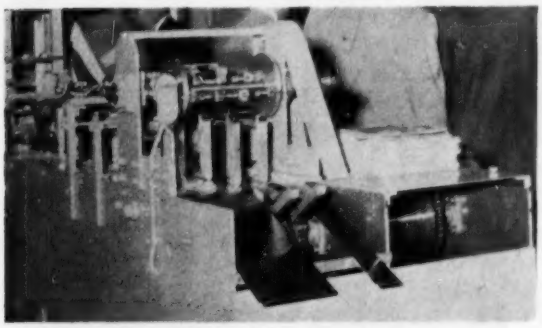
**NEW CLOSING MACHINE** is speedy 10-spindle rotary that takes up to 1,200 cans (202 or 211 size) per min. Unit is synchronized with rotary 60-spout filler. Has hydraulic drive, and features special safety devices. Shown by: Continental Can Co., N. Y. C. (86D)



**UNIT-LOADER** assembles cartons and builds them into unit groups of desired size and shape without need for pallets. Loads are then picked up by clamp-type lift truck. Handles up to 35 cases per min. Maker: Standard Conveyor Co., St. Paul, Minn. (87A)

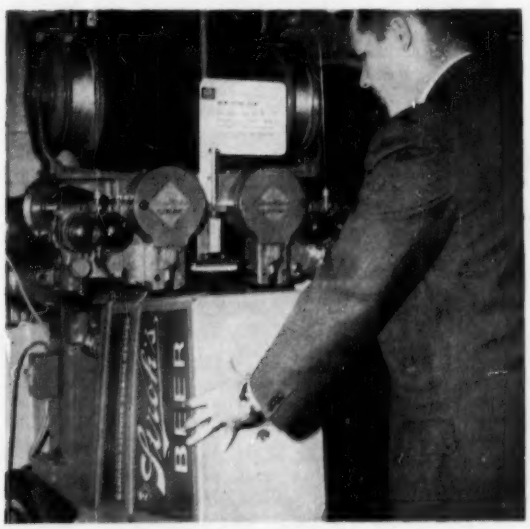


**IMPROVED RACKERS** have tank set 14 in. higher in frame stand, permitting faster flow of beer to racker arms (2 up to 8) with full-opening fittings. Simplified parts also speed up barrel handling operations. Manufacturer of this equipment is Klein Filter & Mfg. Co., Chicago. (87B)

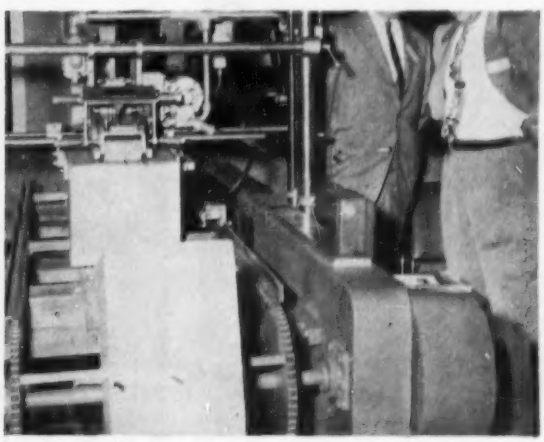


**12-OZ. CAN PACKER** is compact 3x8 ft. machine for filling six-can carriers at speeds up to 750 cans per min. Mercury clutch in speed control permits automatic "no load" starting. Microswitches stop unit when can supply is interrupted Maker: Carton Assoc., Inc., Philadelphia. (87C)

**MACHINE SETS UP** corrugated bottle-shipping cases at speeds up to 25 per min. Adjustable to handle any size cases, it's available with bottom gluer. Manufacturer: Currie Packaging Co., Charlotte, N. C. (87D)

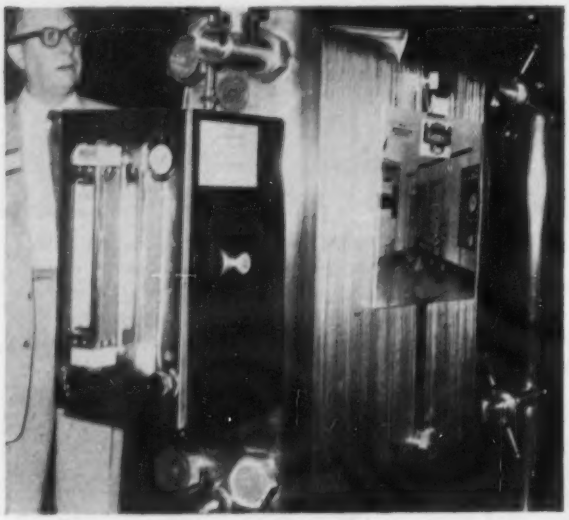



**CARTON STITCHER** is designed to make up 3-piece panel beer cartons. It has end-panel holder, and two foot pedals operate two heads for stitching sides and ends of cases.—Acme Steel Co., Chicago. (87E)

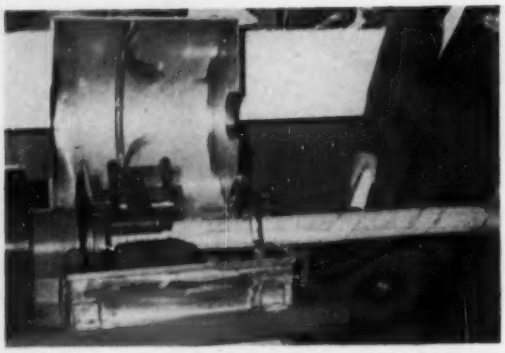


**ADVANCED TAPER** seals up to 1,800 cases per hr. Built to fit over any conveyor, it handles various size cases and runs 8,500 ft. of tape without reload. Self adjusting control cuts tape to proper length.—Wagner Iron Works, Milwaukee. (87F)

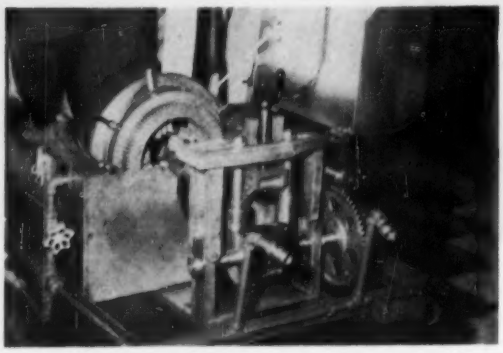
# CLEANERS, AIR STERILIZERS



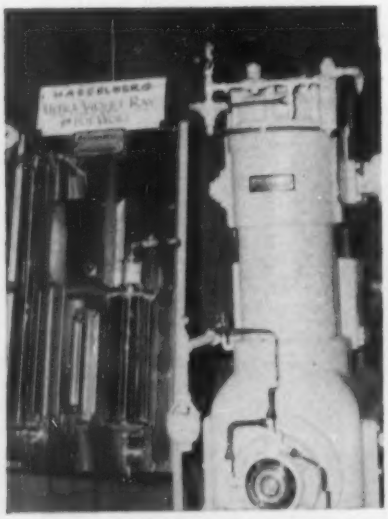
**PURIFIER** uses Fiberglas to filter air that's to be injected under pressure into cold wort. Complete unit includes air-flow meter, pressure gages, control valves, and dispersion nozzle with interconnecting stainless air lines.—Cherry-Burrell Corp., Chicago. (88A)



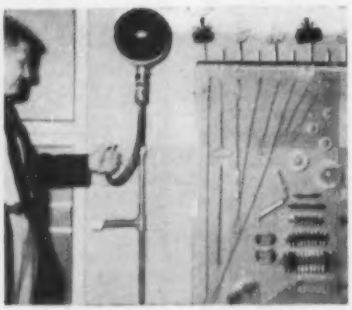
**HOSE WASHER** is rotary unit for scrubbing outside of brewery hoses. A lightweight portable unit, it's built to handle 2 in.-dia. hoses, but has adjustment to accommodate other sizes. With it, two men can clean 50 ft. of 2-in. hose in 5 min.—Duriron Co., Inc., Enzinger Div., Dayton, Ohio. (88B)



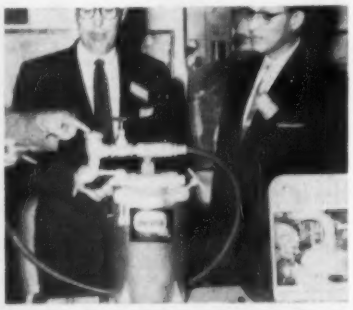
**AUTOMATIC HOSE CLEANER** is adjustable for handling up to 3 in.-dia hoses at rate of about 50 ft. in 3 min. Hand jack-mounted unit features four stainless steel brushes through which detergent solution circulates. Equipped with stainless steel cover. Displayer: Volckening, Inc., Brooklyn. (88C)



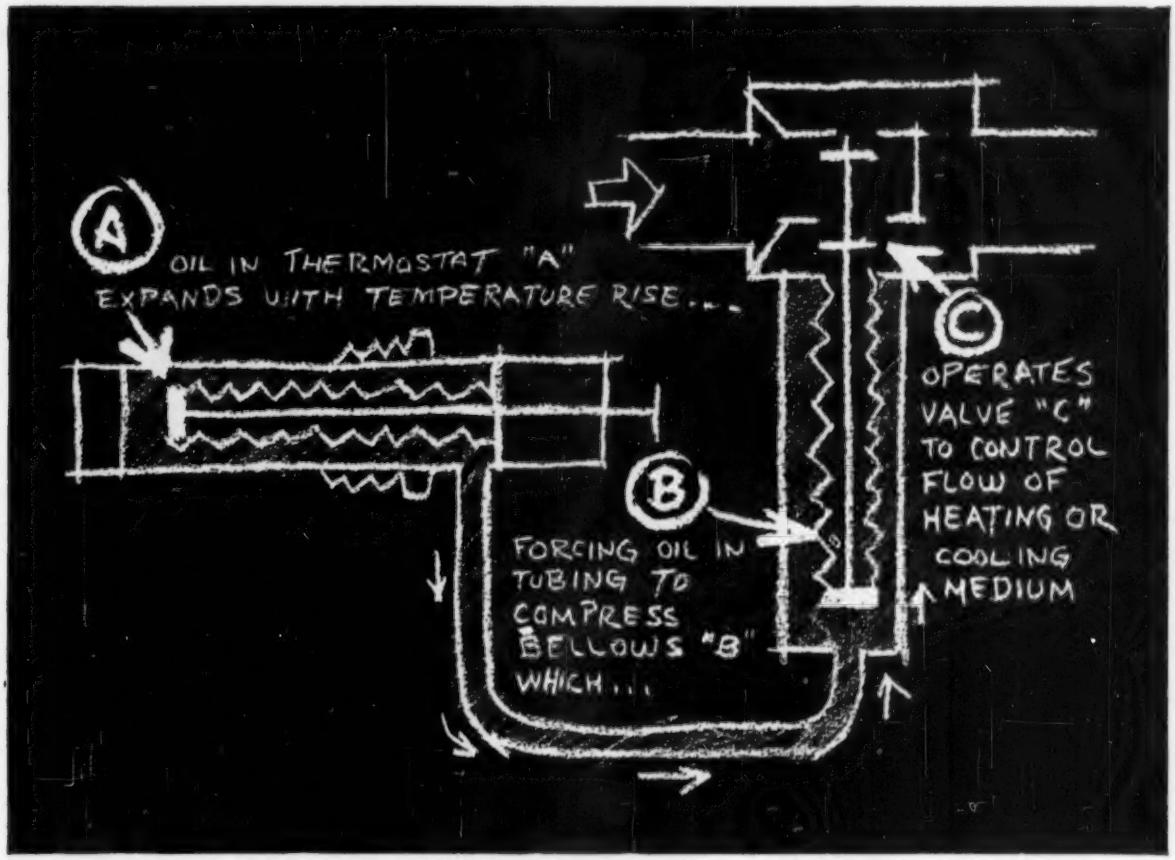
**ULTRA-VIOLET LAMP,** within pressurized stainless steel housing, sterilizes air injected into cold wort. Panel-mounted unit also contains gage for measuring pressure of air forced into the wort. Manufacturer: The Hasselberg Co., Forest Park, Ill. (88D)



**BRUSH CLEANER** for fermenting and holding tanks operates under pressure of 90 psi. Incorporated in 8 in.-dia. rotary brush head is connection for water or detergent lines. Available are Nylon, stainless steel, or synthetic fiber brushes that rotate at 1,500 rpm. Volckening, Inc., Brooklyn. (88E)



**THIS COMPACT CLEANER** directs jet-like stream of hot detergent solution into difficult-to-get-at areas. Readily portable, it requires only water-line hookup with pressure of 40-80 psi. There's no motor or pump to fail, and no coils to clog says maker.—Oakite Products, Inc., N. Y. C. (88F)


A
OIL IN THERMOSTAT "A" EXPANDS WITH TEMPERATURE RISE...
B
FORCING OIL IN TUBING TO COMPRESS BELLOWS "B" WHICH...
C
OPERATES VALVE "C" TO CONTROL FLOW OF HEATING OR COOLING MEDIUM

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Freezer illustrated packs over 2800 sq. ft. of freezing area and 4 hours of freezing time in floor space only 10′ x 64′. Variety of other models with even greater savings to match your plant and product requirements.

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A series of moving trays carry products through freezing cycle continuously, automatically. Increases man-hour output.

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**A COMPLETE, PACKAGED FREEZING PROCESS . . .**

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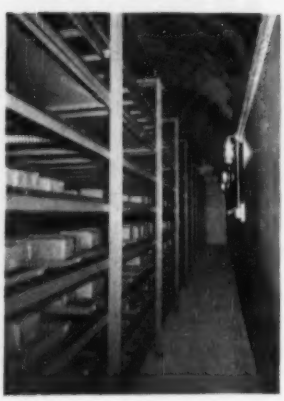
***TESTED . . . PROVEN***

*Write for informative Bulletin #55-122*

*Actual installations prove GREER freezers make freezing fast, economical. Save space, boost quality control.*



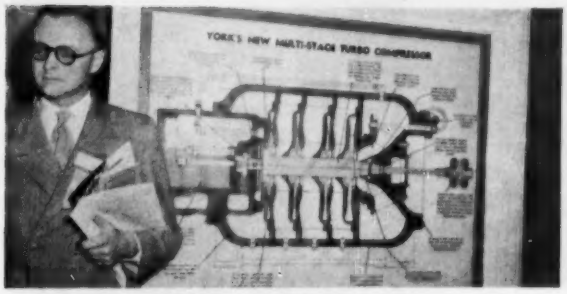
# J. W. GREER COMPANY

WILMINGTON, MASSACHUSETTS

***Sales Engineering Offices: Chicago, Ill., San Francisco, Calif.***

GREER

# REFRIGERATION UNIT, PUMP



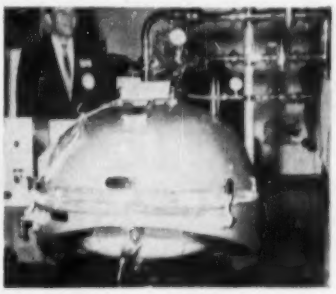
**NEW COMPRESSOR** (multi-stage turbo) is revealed by diagram. Employs any number of refrigerants to produce desired temperatures over wide range of capacities (100-4,000 tons).—York Corp., York, Pa. (91A)

**PNEUMATIC-CONTROL** vented-cover pump has built-in pressure-relief valve regulated by air pressure controlled in chamber with rubber diaphragm. Running at constant speed against a constant head pressure, pump delivers according to amount of air pressure applied to diaphragm.—Waukesha Foundry Co., Waukesha, Wis. (91B)

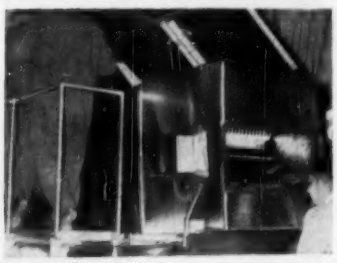
**HORIZONTAL-PLATE UNIT** is designed for fine filtering and polishing of small batches without need of scavenger leaf. Accommodates almost all filter media. Is built to eliminate plate warping and leakage. Plates are removable as one unit. Niagara Filters Div., American Machine & Metals, Inc., E. Moline, Ill. (91C)

# CLARIFIERS, SEPARATOR

**BEER CLARIFIER** has capacity up to 4,400 gph. It's designed for simplest beer changeovers without tedious water flushing. Hermetically constructed, unit prevents beer oxidation and $CO_2$ losses. Centrifugal clarifier is driven by direct-coupled 15-hp. electric motor.—De Laval Separator Co., Poughkeepsie, N. Y. (91E)



**THIS SELF-CLEANING** centrifugal clarifier handles 100 bbl. of trub wort hourly. Solids gradually build up in periphery of bowl, to be expelled through automatic discharge operated by electric timer hooked to solenoid valve. Routine calls for cleanups after 4-6 weeks running.—Foreign unit displayed by Cherry-Burrell Corp., Chicago. (91F)



**CONTINUOUS UNIT** cascades kettle brew off stainless plates onto finely perforated, self-cleaning strainer plates. Hops then slide down sharp-angled strainers and are conveyed to disposal. Four sizes (10-, 20-, 30-, and 40-bbl.-per.-min.) are offered by maker.—F. C. Deckebach Sons Co., Div. of Brighton Corp., Cincinnati. (91D)

**250 BBL./HR.** is capacity of this diatomaceous filter. Employed in unit are sheets that can be washed and re-used. Filter-material savings of 30% are reported. There are special construction features for easy cleaning and maintenance. Displayer: Buhler Brothers, Inc., Fort Lee, N. J. (91G)

**For detailed data on units circle key number of Readers' Service Card in back of book**

**FOODS FROM MANY** manufacturers are "pooled" at new distribution center, where lift-trucks quickly load "tomorrow's" freight cars. LCL shipments can be assembled and shipped at carload rates.

# Boosts Distribution Efficiency

**Big, new warehousing center permits carload advantages for LCL shipments, and cuts costs with efficient handling innovations**

**FE STAFF**

RELIEF FROM THE SQUEEZE on food warehousing and shipping costs is promised by a new type of distribution center. And this innovation looks like an answer to other pressing problems—those growing out of the trend to small super-market inventories and a demand upon manufacturers for quick, less-than-carload delivery at carload rates.

First of a dozen distributing centers to be built throughout the county, this pioneering system has been put into operation by Calumet Industrial District, Chicago. The system will enable a number of manufacturers to combine small orders into full car or truck loads for faster, cheaper shipment. And engineered into it are speed-up innovations in warehousing, materials handling, and shipping.

The CID set-up has huge capacity for recieving and shipping, not only in car and truck lots, but in smaller quantities. And it eliminates the "stopover" car and multiple-customer cars or trucks.

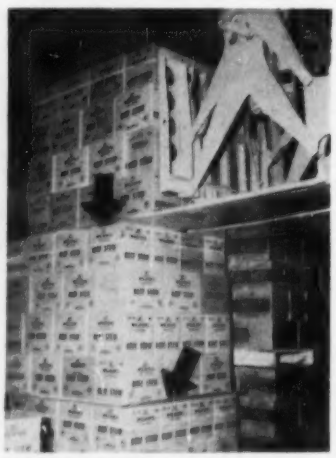
Located on a 200-acre tract, the facilities will include 3,000,000 sq. ft. of floor space when all buildings are completed. Interior streets enable flatbed trailer trucks to drive into the one-story warehouses. And 40,000 lb. of palletized merchandise can be unloaded from the flatbeds in 5 min. by two lift-truck operators.

Nor do pick-up drivers waste any time. Their loads are ready at ramps. And a loudspeaker system in the control tower marshalls in and out traffic and tells drivers at which of the 84 ramps to pick up their loads.

Dock-high doors along the entire length of each building accommodate all trucks without waiting. And this permits incoming inventory to be delivered where it is to be stored, without rehandling

Manufacturers send their orders to CID by closed teletype, and these orders are used for shipping and inventory control.

When CID's facilities were displayed at a recent seminar, several advances in transportation, materials



**THIN ALUMINUM PALLET** (arrows) saves space. It is automatically retrieved by special fork-lift truck when goods are loaded into cars.

handling, and warehousing were displayed.

One innovation is the new Unit Load railroad car, designed for palletized mechanical loading in minutes intsead of hours—and with elimination of damage in transit. This was developed by CID and the International Steel Co., Evansville, Ind.

It takes a man and fork-lift truck about 20 min. to load and unload a Unit Load car. And goods move from flatbed truck trailers, to warehouse, to cars with palletized efficiency.

The new car accommodates a consolidated shipment of a variety of products with extreme handling ease. It contains five compartments, each the width of a highway trailer, and large enough for eight 40x48-in. pallets.

The new car is accessible from either side through 7½x9¼-ft. openings, closed by panelized overhead roll-type doors.

Shipping tests by Armour, Anheuser-Busch, General Foods, and Lever Brothers revealed not only tremendous savings in manhours for loading and unloading the car, but complete elimination of damage without dunnage or banding.

About 100 Unit Load cars will be built by early '57 and 3,000 by the end of that year.

#### Loads Cars Automatically

Latest CID labor-saving concept—an automatic mechanical carloader for Unit Load cars—was designed to revolutionize present loading methods and costs in volume-production plants.

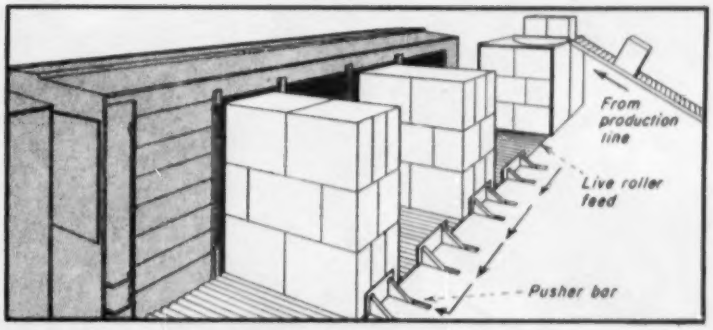
Unitized loads travel from the production line to the car on a live roller conveyor. Then hydraulically operated bars push the loads into the compartments.

#### Fluidizer and Portable Bin

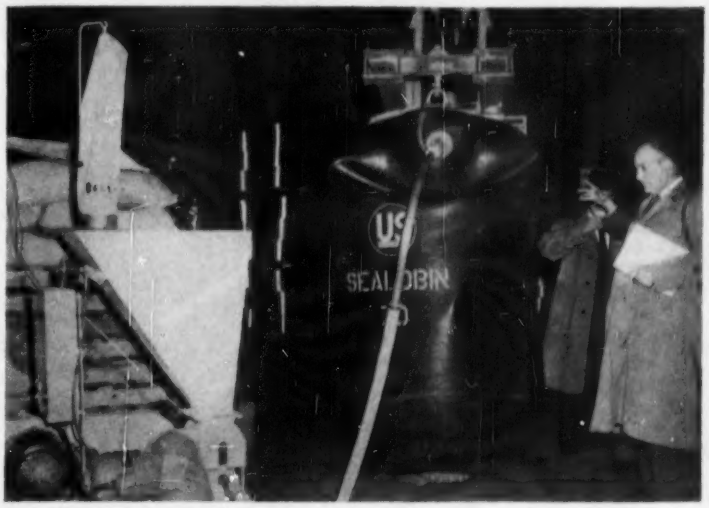
Among other innovations displayed at the CID seminar was the new fluidizing system for high-speed bulk loading, developed by Superior Separator Co., Hopkins, Minn. It conveyed 70 lb. of corn meal per minute into portable 10,000-lb capacity U. S. Rubber Sealdbins, and the latter were moved by a fork-lift truck.

On arrival, Sealdbins unload fast, eliminate demurrage charges, and are their own indoor and outdoor "warehouses." Empties (180-lb.) collapse and fold for easy return. They can

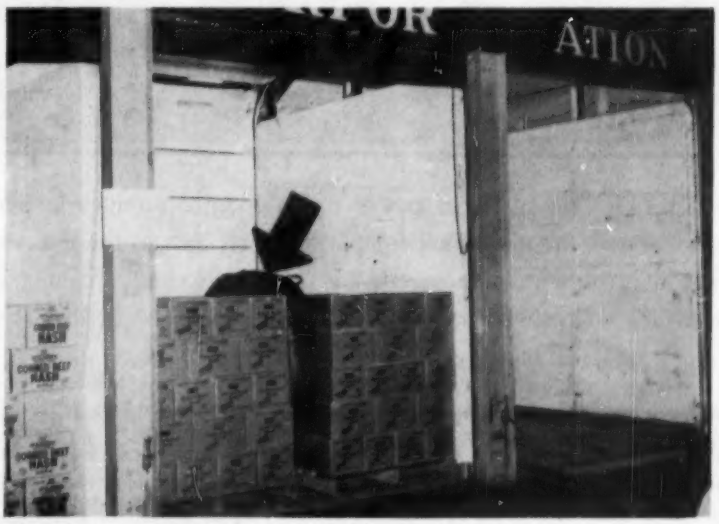
(*Turn to page* 133)




**AUTOMATIC CAR** loading, latest labor-saving idea, is diagrammed here. Unitized loads travel to car doors on live roller conveyor. Pusher bars shove them into new Unit Load cars.




**FLUIDIZER** fills rubber bin, and fork-lift truck moves it, for efficient handling of flowable materials like flour and sugar.



**INFLATABLE DUNNAGE** (arrow) tightens load to avoid damage to cased foods during shipment in cars.

*ONLY GOOD FLAVORS* can be relied upon to produce tastier, more palate-tempting confections. And the most competent production men in the industry are agreed that no matter what may be a manufacturer's advantages in candy making experience and facilities, his finished goods can be no better than the materials used in their manufacture. Remember: *Your product is* ONLY *as good as its* FLAVOR!

For helpful information on the flavoring of CONFECTIONS or other food or beverage products, write our Flavor Division, Dept. FE.

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# Quickly Tells Aeration Efficiency

**Lab-made device measures dissolved oxygen right in processing vessel. Developed for control of yeast fermentations, unit is seen applicable to waste disposal and other vigorously aerated systems**

**JOSEPH AMSZ, JR. and HENRY J. PEPPLER**
Research Department, Red Star Yeast & Products Co., Milwaukee

AN APPARATUS for following changes in oxygen content of a metabolically active suspension of microorganisms has been developed in our Red Star Products Co. research laboratory.

**Its use has facilitated evaluation of aeration efficiencies in experimental systems. And it should prove similarly valuable to other systems—such as waste disposal in which the solution is being vigorously aerated.**

The apparatus—a submersible vibrating platinum micro electrode (see illustration right)—comprises an ordinary single coil a.c. buzzer on a sliding track inside a 6-in. length of 3-in.-dia. copper pipe.

### How It's Made

A heavy walled glass capillary tube, having a small piece of 24 B&S gage platinum wire sealed through the lower end, is fastened to the vibrator arm of the buzzer. A clamp, made of a strip of sheet copper, may be used to attach the upper, open end of the capillary tube to the armature.

Capillary tube is then filled nearly to the top with mercury to serve as an electrical contact between platinum wire and polarograph lead wire, which is simply inserted in top of tube.

Wire-tipped glass tube and a saturated calomel electrode are extended through a rubber stopper at the bottom of the unit. This stopper should have a circular "step" cut into it, leaving a diaphragm approximately 0.25 in. thick through which the platium electrode tube passes.

Leads from calomel electrode, platinum electrode, and buzzer are passed through a short section of metallic tubing or pipe and continue upward through a length of rubber tubing slipped over the protruding pipe. Leads and tubing up to 21 ft. in length have been satisfactory.

### Suspended by Extension Rods

To provide a means of lowering unit into deep vessels, a metal rod, with its upper end threaded, is welded to the outside of the case. Extension rods may then be coupled to permit lowering the unit to the depth desired—limited, of course, by length of the leads. Case and rods may be coated with a protective, corrosion-resistant material, as may be required by the nature of the liquid medium in which it is to be used.

Before closing top of unit, buzzer with its attached electrode tube is positioned on the sliding track in such manner as to produce an amplitude of vibration of lower end of tube of approximately $\frac{1}{8}$ in.

Exposed platinum wire should not exceed $\frac{1}{8}$ in.—in order to prevent excessive flexure induced by the vibration of tube. Wire is well coated with wax, or other soft, non-conducting material.

After cooling to solidify coating, end of wire is snipped off with sharp scissors. But only the shortest possible length is removed, in order to provide a clean, uncoated cross-sectional area.

Both upper and lower closures are seated to insure water tightness. Electrode leads are connected to the constant-voltage jack of a polarograph ordinarily used

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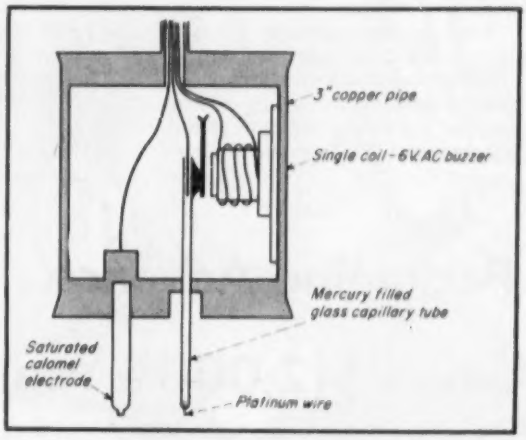
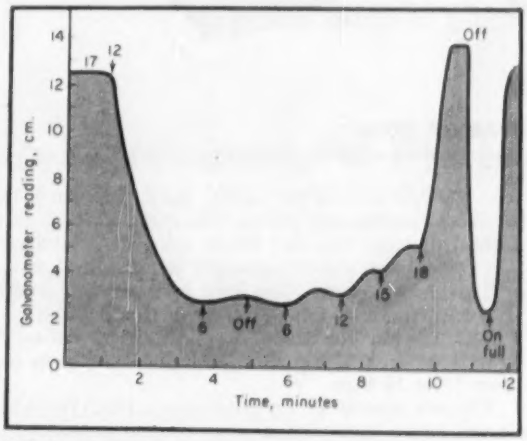



**UNIT** comprises a.c. buzzer in copper pipe, platinum wire sealed in capillary tube, and saturated calomel electrode.




**HOW** actively respiring yeast suspension responds to changes in aeration rate (arrows) of molasses medium.

for the dropping mercury electrode. Leads from buzzer are then connected to a 10v. step-down transformer, which is operated from the usual 110v. a.c. source.

#### How It's Used

Unit is submerged in medium to be tested, current supplied to the vibrator, and a constant voltage of about 0.9v. applied to the microelectrode.

The resultant diffusion current, after stabilization, may then be calculated from observed deflection of galvanometer, the shunt ratio chosen, and the calibration constant of the galvanometer. In some cases galvanometer deflections as read on meter scale may serve as arbitrary units for comparative purposes.

Our graph (second illustration, p. 95) is a copy of a photo tracing obtained when this apparatus was used to indicate changes in oxygen content of an actively respiring yeast suspension in molasses medium. In this case, the instrument response in terms of galvanometer scale deflection is plotted against time. The tracing thus indicates amplitude and rapidity of response to changes in the aeration rates. Points at which aeration rate was altered are indicated by air flow ratemeter settings (arrows).

In the application of this device to estimation of oxygen in complex media, calibration of instrument in terms of quantitative units of oxygen remains a particular problem. A colorless liquid of simple and constant composition would permit calibration of comparisons of the instrument responses with oxygen values obtained by titration with sodium thiosulfate using the standard Winkler method (Treadwell and Hall, 1928) with manganous sulfate and potassium iodide.

In those instances where the medium is highly colored and/or gradually changing in chemical composition, a reliable quantitative calibration is virtually impossible to achieve.

# Packaging Advance Saves $12,000 a Year

**Former costs are slashed when air-jets solve flap-opening problem in mechanized closing of reused cases**

**WARNER BEEM**
Plant Superintendent, Blue Bell Potato Chip Co., Portland, Ore.

BY STANDARDIZING CASE SIZE and then introducing mechanical sealing with quick-breaking glue instead of tape, Blue Bell Potato Chip Co., Portland, Ore., now saves $12,000 annually in packaging costs.

**Four workers were thus freed from this operation. They now work at other stations in the plant.**

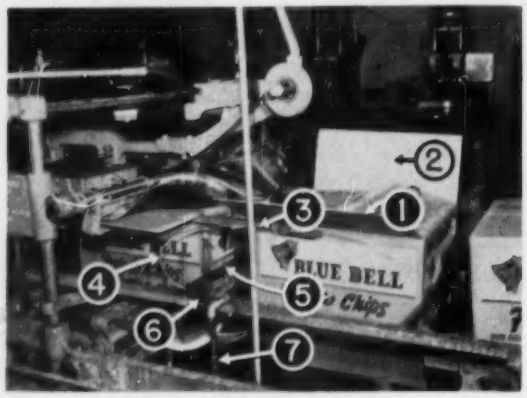
**And whereas the taped case had to be discarded after 5 or 6 round-trips, the new glued case lasts for from 12 to 18 trips.**

The new standardized resuable case is 19x23½x12½ in. It will hold a variety of packages ranging from the 1¼ oz. size (quantity, 5 doz.) to the 2-lb. bulk boxes of chips (quantity, 4).

The more often a case is glued, then opened, the less the tensile strength in its fiberboard flaps. While the case-sealer would efficiently seal new cases, its flap-guides could not pick up the limp, often-opened flaps. These became so flexible that they would lie flat against the case top, instead of assuming the partially opened angle, characteristic of a new case.

#### Jets Solve It

At the outset, it was necessary to employ an operator to manually open these flaps. But now, with the installation of air-jets, the unit works automatically, as it was intended. The new system comprises two air-lines (90 psi), two valves, and two air jets.




**CLOSEUP** of Blue Bell's air-jet installation. Photo was snapped just as flap (1) was blown open by jet from opposite side. Unit on this side—which a moment before lifted flap (2)—illustrates system: Air blows out hole (3) bored in flap guide and fed by line (4). Jet is actuated when chain-powered bar (5) triggers valve (6). Air is supplied via pipe (7).

Fixed to the two horizontal case-guides (which extend from feed-end to discharge end of unit) are the valves. They are triggered by chain-powered bars. In the arrangement employed, the bar preceding the case that is to have its flaps opened is the one which operates the valves.

To provide alternate jets of air—by which to open one and then the other flap in sequence—one valve is positioned on its case guide a bit forward from the other on the opposite side. Of course, the jets, too, are similarly located to provide the necessary 1-2 action. These jets are merely ¼-in. holes bored in each of the flap-guides.

In operation, the air-lines are run into these holes, the first jet blows back the flap on the opposite side of the case. Next, the alternate jet turns back the other flap. Then the properly opened case moves into the sealer's plows preceding the glue-rolls.

MicroRold® STAINLESS SHEET

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# up to 48" WIDE

BRIGHTER THAN EVER!—MicroRold stainless steel Type 430 in the NEW Bright Finish is now immediately available in sheets up to 48" wide offering new usefulness and economy in stainless fabrication. Produced with the same micro-accuracy of gauge for which MicroRold 36" is well known, Type 430 Bright up to 48" wide gives greater latitude in applications for quality stainless steel.

MicroRold 430 is also available in the regular commercial finishes and MicroRold stainless in other grades are now produced up to 48" wide. Complete details sent on request.

**Washington Steel Corporation**

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ROAD TRAIN of truck-tractor and four-wheeled trailer carry two loaded Mobil-Vans. Overall length is less than 50 ft. Note slots for forks of lift truck (A), "pancake" under-cab engine, (B), and pusher type forward rear axle (C).

# Transferable Van-Bodies Permit 3-Way Deliveries

**Capacious, cost-saving units can be shipped all-truck, all-rail, or by combination of two**

AN UNUSUAL shipping system—called Mobil-Van—is now offering Midwest food distributors three hot new advantages:

- Reduction in handling costs
- Reduction in cargo damage
- Flexibility in distribution

The new unit comprises a removable trailer body that may be carried either by tractor, trailer, or railway flatcar—without reloading.

The system was inaugurated early this year by Spector Freight System, Inc., Chicago, when it combined its highway service with the Pennsylvania Railroad's Rail-Trailer Co.

The loaded trailer body is carried from the shipper's dock by local pickup tractor and trailer. At the terminal, the van-body is removed by fork-lift truck and placed on a road tractor or its four-wheeled trailer. Each tractor-trailer combination carries two Mobil-Vans.

If desired, however, the local trucks can carry the van-bodies directly to railhead, where forklifts place three on each 75-ft. flatcar.

Depending on distance traveled and time allowed, the distributor may use either road or rail, or a combination of both.

In Spector's initial experiment, a two-van unit traveled by highway and a three-van unit by rail from Union, N. J., to Chicago (840 miles). Time for both was 29 hr.

Though Spector is still experimenting to determine fnll advantages and disadvantages of the system, it has increased its equipment to 32 van-body units, 32 special four-wheeled trailers, and four specially designed tractor-trucks. Each week, nine van-bodies are shipped by rail. And two round trips are made weekly by the four road units.

The Mobil-Van resembles a conventional trailer body with rear and side doors. It measures 21½ x 8½ ft. Made of aluminum, it weighs 3,200 lb. and has a volumetric capacity of 1,330 cu. ft. It will carry a payload of 24,500 lb.

A patented locking device beneath the van-body secures it to the truck, trailer, or flatcar without additional tie-down equipment. Two slots at bottom of unit provide access for forks of the lift trucks.

The lift truck is pneumatic-tired, gasoline-powered, with a lift capacity of 15 tons (Clark-Ross).

The special tractor-truck (White) features a diesel engine (Cummins) placed horizontally under the cab. Called the Freightliner, this tractor has a dual rear axle consisting of a conventional dual-tired rear-most axle and a pusher-type, single-tired axle just ahead.

**Engine Under Cab**

Use of the "pancake" engine reduces the wheelbase so it may carry a van-body on its own chassis, as well as another on the trailer. Total length of tractor and trailer is under 50 ft., maximum allowed in states now traveled by the Spector fleet.

The system is patented by Clark Equipment Co., however Fruehauf Trailer Co. built the bodies.

In the states most restrictive on weights—New York and Pennsylvania—the gross allowable road weight is 63,000 lb. per unit. After deducting equipment weights, this means a two-unit payload of 40,000 lb. The rail payload is a full 24,500 lb. per van-body, or 73,500 per three-unit flatcar.

Proponents of the new system envision use of insulated units for carrying refrigerated commodities.

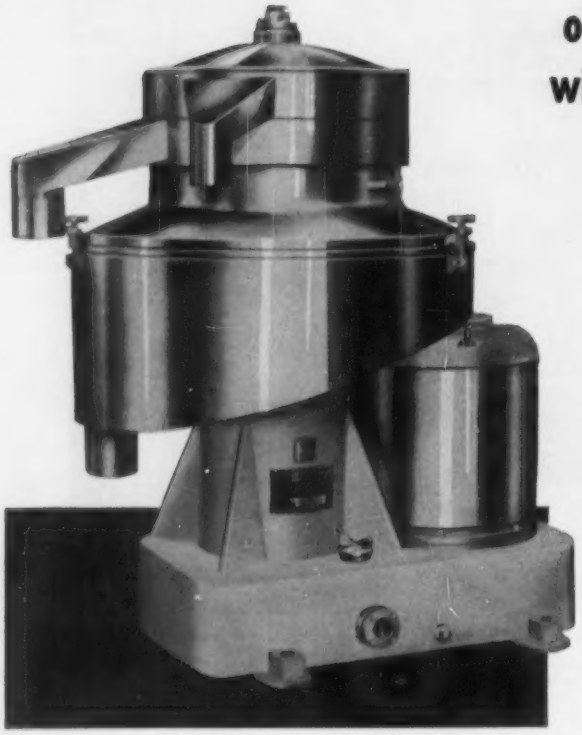
**SIMPLE SWITCHING:** **. . . Off truck**

**. . . onto flatcar**

**—And vice versa at destination for local delivery**

# The Food Industry USES the SHARPLES DH-3 Nozljector

## for a WIDE VARIETY of PRODUCTS and PROCESSES with CONTINUOUS PRODUCTION



| | |
|---|---|
| ✓ | Concentration of tomato pulp |
| ✓ | Purification of beer adjuncts |
| ✓ | Recovery of cod liver oil |
| ✓ | Clarification of apple products |
| ✓ | Concentration of corn and wheat starch and gluten |
| ✓ | Recovery of citrus oils |
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The Sharples Heavy Duty DH-3 Nozljector is doing an outstanding job in the food industry. It is ruggedly built, of sanitary construction, and provides peak performance at high capacity—whether used as a separator, as a clarifier, or with re-cycle, as a concentrator or wet classifier.

We would be pleased to discuss the advantages of the DH-3 in your processing, and can arrange to have test runs on your product performed in the Sharples laboratories. Bulletin 1279 is a good starting point; we'll be glad to send you a copy.

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# Poultry Bagging Sped By Air-Squeeze Unit

**Vacuum and heat-shrink steps are cut out by using form-fitting polyethylene bag and a special wringer machine that stretches film and 'rolls out' air**

A NEW POLYETHYLENE PACKAGE—shaped like the silhouette of a bullet—eliminates heat shrinking and conventional vacuumizing operations in packaging frozen, eviscerated poultry.

Handled on a specially developed closing machine, the new bag is now boosting wrapping speed and saving dollars at Butterfield Produce Co.'s plant in Butterfield, Minn.

**In fact, within days after four machines employing the new technique were installed at the plant, Butterfield turned out 3,000 Beltsville-fryer turkeys in 3 hr. and 6 min. And one newly-hired operator was able to package 6 turkeys per min. after only two days experience.**

Plant tests on the new round-bottomed bag (called Duratite, made by Herb-Shelly, Inc., Farmington, Minn.) reveal that it will take temperatures as low as -90F. without cracking, shattering, or tearing.

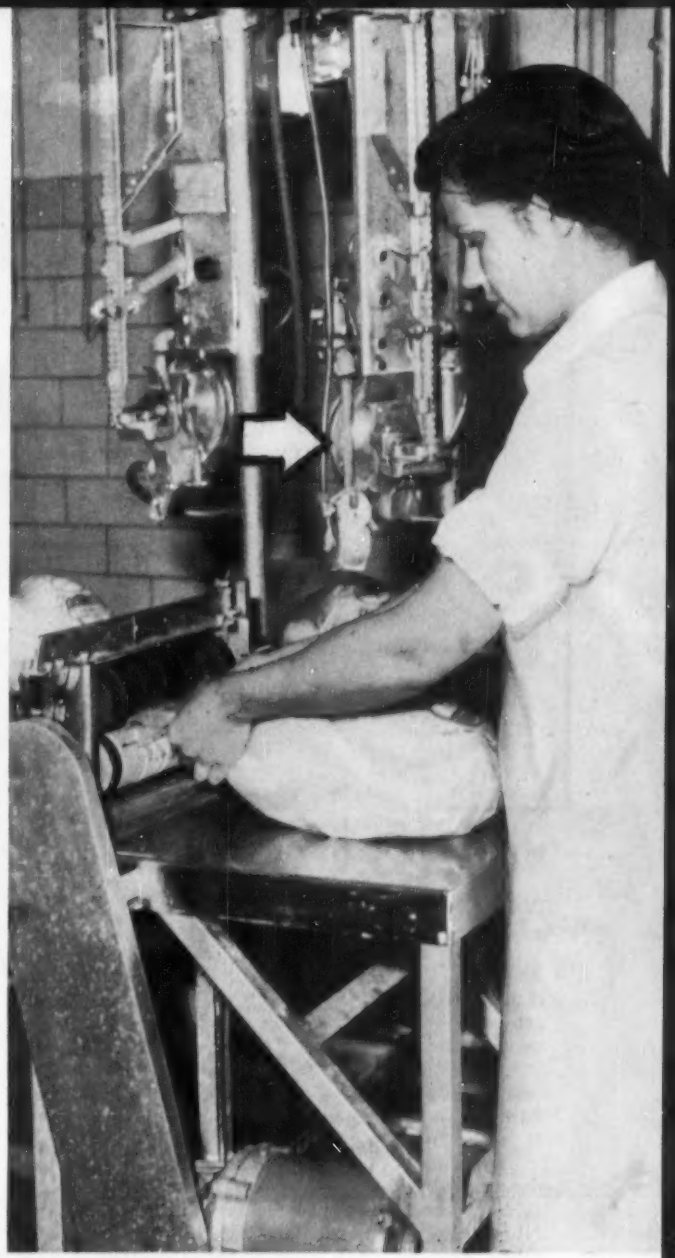
It is also less expensive, according to Ned Gustafson, vice-president and manager of Butterfield. He calls it a simpler way to deliver shapely, durably-packed birds to the distributors.

### Rollers Squeeze Out the Air

In the plant operation, workers place the birds in properly sized bags (there are six sizes made to fit turkeys from 4 to 8 lb.), then drop them on a conveyor leading to the four packagers.

Here, operators take bagged birds, and—without any preliminary vacuuming—insert lips of the bags between rollers on the closing machine (made for the Duratite technique by Process Packages, Inc., of Minneapolis, Minn.).

The unit's operation is similar to that of a washing machine wringer. Its rotating rollers force the turkey down in the bag. The "piston action" of the bird displaces the air, which is then expelled from the package by the action of special grooves in the rollers (see photo). In brief, these grooves allow the film in the neck of the bag to form air-escape channels.



**GROOVED ROLLERS** squeeze out air and stretch film in new polyethylene bag-package for frozen, eviscerated poultry. After bag neck is twisted, it is clipped and trimmed on second unit (arrow).

The packaging material stretches, forming the turkey into a compact, plump shape. Operator then twists neck of bag and seals it with a metal clip on a second machine (made by Hydrahone Equipment Sales Co., Milwaukee). After excess plastic is trimmed from the bag neck, finished package is dropped on a conveyor that whisks it directly to freezing.

Being transparent, the tough polyethylene shows the bird to good advantage. This material is also highly printable, and invites multi-color trademarks and sales messages.

At Butterfield, birds are packaged in the traditional breast-first way. However, the process is adaptable to a hock-first pack, too.

**"This is the time," Ole emphasized, with a baton-like swing of his pipe, "to strictly follow the rules laid down by the one top man who, alone, shoulders the responsibility."**

# What Should You Do Before Workers Vote On Union Question?

***Old Sage Episode***

**IVAN C. MILLER**
Associate Editor, "Food Engineering"

BEFORE HE GOT HIS DESSERT, Batt Bulwark, manager of Mull & Mull Co., was already "edgy" to get going again on that hot subject, "What do you do when the union starts organizing your plant?"

At the previous meeting of the Guff & Gripers, lateness of the hour had shut off the discussion just when Batt was in full gusto, so now he wanted to get back at it once more.

"You'll recall," he pointed out brusquely, "that Ole Sage said there are a lot of do's and don'ts that management should observe between the time when an NLRB election is agreed on and the day set for the actual election. You'll remember, too, that I said, 'Give us some for-instances, starting with the do's.' So, Ole, suppose you start giving."

**Ole looked around the group** to be sure there was approval of such an early start on the matter. Then, above the clatter of the dishes, he addressed himself to Bertram Barnastian, senior partner of Barnastian Bros. Baking Co., whose plant situation had initiated the discussion.

"First," asked Ole, "what's the situation at your plant now, B. B.?"

"Practically unchanged," Bert reported. "You see, I've been out of town most of the time, so I only learned today that the union agent was in an auto accident. Whether for that reason or not, I haven't heard much about the union's activities recently. However, I have no reason to believe they won't start again soon."

"It's a safe bet they will," Batt predicted. "Anyhow, you'll now have a bit more time to put Ole's do's and dont's to work at your place. All right, Ole, shoot!"

"Having agreed to an election," Ole explained in response, "a vital 'do' is for the company to work to establish the limits of the bargaining unit. This determines who votes in the election. Also, it eliminates many persons from balloting—including persons who some unions might try to have vote, to the disadvantage of management and employees, too."

"Since foremen and supervisors are considered as a part of management—legally," Personnel Manager Milt Sorenson injected, "such personnel are barred by the Taft-Hartley Law from joining a plant union, so they're out. Guards, too, are legally excluded."

"It's those who are *not* legally barred from the bargaining group," Ole insisted, "that the company must be concerned about. The company should be sure to rule out peak-season or temporary employees. It should scratch off office personnel, too, including office timekeepers and other white-collar workers. And it shouldn't overlook spot labor and truck drivers."

After a pause for a sip of coffee, Ole added: "It has always seemed to me that the more homogeneous the bargaining group, the better for the members in the long run, and the better for the company, too."

"I know that foremen are management," spoke up Bert Barnastian. "So I can plainly see why they shouldn't belong to an employee union." "But we have only a very few guards so why shouldn't they belong to the company union? . . . not that I'm making a case for them," he added. "It's just that I'm curious about it."

"Well," replied Ole, "the fact is that guards have the right to organize their own unions, if they want to. But they cannot belong to any of the plant unions because it's their responsibility, as guards, to protect life and property. And I'm sure you can see that guards

# *It's the Nash!*

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Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

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*the cellular, stay-dry insulation*

**STAYS DRY**—Here's how you can prove to yourself that FOAMGLAS does stay dry. Cut a piece from a FOAMGLAS sample. Place it in water. Note how its hermetically sealed glass cells keep it afloat. Weight it down for days, weeks or longer if you like. Remove the weight and it bobs back to the surface . . . proof that the sealed cells have absorbed no water—still have their original insulating efficiency.

## Wet insulation is no insulation . . .

# Prove to yourself that FOAMGLAS stays dry!

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That can't happen to FOAMGLAS. Every block of this unique insulating material is composed of millions of hermetically sealed glass cells. Each cell is an individual insulating unit . . . and each is watertight. Water and vapor are sealed out to insure constant insulating effectiveness.

In a few minutes, in your own office, *you* can prove to yourself that FOAMGLAS *stays dry*. Send today for a free sample and directions for simple "desk top tests" you can perform, as illustrated on this page. You'll soon see why it pays to insulate floors, walls, ceilings, roofs, piping and equipment with FOAMGLAS. You're assured constant, long-lasting insulating efficiency without the headache and expense of insulation replacement.

Vapor-proof

Strong and rigid

Inorganic and incombustible

Lightweight

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can't serve as pickets for a plant union, or refuse to cross a picket line, when plant employees go on strike—and still continue to devote their attention to the protection of life and property."

**Bert now interrupted his note taking** to ask: "Anyone else to exclude from the bargaining unit?"

"Yes, there are a few others who should be eliminated," Ole replied, "among them those who have access to confidential information or who served in other capacities of management type, with or without title. Also, anyone in training for a management function should be barred."

"One thing that seems vital to me," contributed Silas Worth, personnel manager at Zenith Canning Co., "is that management should, however, make sure that everyone eligible to vote has the chance to vote, and also management should urge that everyone does."

"Very necessary," Ole agreed. "And that's regardless of which way the final election tally may go. To assure as much management-employee harmony as possible in the future, the outcome of the election should represent the wishes of a majority of the employees. And now another thing: You can see from this that time and place become critical elements here."

At this point, Zenith Superintendent Ed Strong reminisced aloud: "Seems like a long time ago," he said, "but I remember quite well our first election. It was held in the lunch room at noon—between 12 and 1—as I recall."

"The election at Y & G," spoke up Tom Watson, "was held between shifts, to make it possible for everyone to vote."

At this point Bert cut in: "Forgive me, but I'd very much like to shift back to this business of who votes. Surely, the union won't let management do *all* the picking."

Ole nodded. "On that point," he informed Bert, "It's best for management and the union's agent to agree if at all possible. However, those named by one side and not agreed on by the other side may be contested later."

**"Not infrequently,"** contributed Milt, "you'll find the agent will try to pad the list with any past or present employees whom he thinks will vote for the union. And I guess—if you look at it his way—you can't blame him. For if the union is voted in, the more the membership potential, the more the dues. Also, the greater will be the union's influence.

---

**UP THE HARD WAY came Ole, our principal character in this special series of "cases" fictionized to pinpoint boss-worker problems in the food plant.**

**Ole began as a laborer, proved himself "a good worker" who "used his head"—thus won the respect of both workers and bosses. He later rose to foreman, then superintendent. And finally he was management's choice as "a natural" to head Industrial Relations, a job he carried out with unusual success until his retirement.**

**—Actually, his was a very short retirement. Because his old company, and others, too, quickly were calling to him for counsel—as related in these episodes.—*The Editor.***

---

**"THERE ARE DO'S AND DON'TS to heed before that critical plant-election day," stresses Ole. Involved, he points out, are such prime matters as who votes and who keeps watch, also who carries responsibility at top level and who fosters harmony at line level.**

"So, you see," Milt concluded, "you must be as sure as possible that only your regular employees—only those who really constitute a unified bargaining group—are left on the eligible list."

"No doubt about that," Ed Strong verified. "Before the election at our plant, the agent had rounded up ex-employees who hadn't worked for the company in a long, long time. And he tried to keep them on the list, claiming, 'They're just waiting to come back to their jobs'."

"Like in any other election," Ole further explained, again directing the talk back on the main line, "the union will appoint an election observer—and so should the company—to challenge unqualified voters, including those in dispute. True, the company can't appoint a member of its supervisory staff as an observer. Nevertheless, management should make certain it selects someone who can recognize every regular employee. "So," Ole urged, "make that selection carefully. It's vital."

At this break in the discussion, Bert spoke up to speed matters: "Of course, if there are still more do's to cover, I want to hear them," he said. "But since there very likely are many more don'ts than do's, I'm anxious to hear as many of the don'ts as possible at this session."

**Most of the eyes of the group** now turned back to Ole Sage, and Batt blurted, "It's your hot potato, Ole, so toss it."

"Most of the don'ts," Ole explained, "fall into two groups—namely, don't interfere, and don't discriminate. Everyone in management must be alert in order to avoid every apparent breach, every slightest incident that might be classed as either one of these."

He paused to let this sink in, then he admonished: "Here, let me emphasize strongly that your foremen—your supervisory personnel—are by far your most vital people during this period. I would urge that frequent meetings be held to school them in what they must do—and even more important, what they must *not* do."

As Ole stopped to stoke his briar, Barney Hasbrook tore several pages from his notebook and handed them to Bert, then turned back to Ole and suggested, "Give us a rundown—a list of the don'ts so that Bert can get them into his notes."

"Okay," agreed Ole, "let's start with the list headed 'Don't interfere,'—and incidentally, all these do's and don'ts also apply when your employees belong to one union and another union is trying to take over. And now to go on: First of all, during this period no one in management, especially foremen, should take independent action. Because this is the time,"—and he emphasized with a baton-like swing of his pipe—"to strictly follow the rules laid down by the one top man

(*Turn to page 201*)

# Don't Stop Fighting for Sound Food Law

Progress in food formulation is moving at a rapid pace. This means that we may expect many more new uses of chemical additives and other novel ingredients.

Innovations in packaging may come even faster than developments in food products, for new packaging materials offer challenging opportunities for improvement. And the toxicity question frequently arises when a new packaging material comes up for consideration.

Progress through additives is desirable and inevitable. No advance is warranted, however, unless the new product or the better package is free from hazard to the public health. Thus the proponent of a new ingredient must pre-test it if there be any question as to dietetic safety.

**Alarmists overstress the need**

Some folks have thought also that all new additives must be officially approved to insure their safety. But legislation proposing new official restrictions and regulatory control is not as critically needed as some alarmists seem to believe. The safety record of commercially packed food has been excellent under the existing law.

The public deserves protection. No one will debate that. And insuring such protection is in part the responsibility of the Food & Drug Administration. But the primary responsibility rests with the proponent of a novel ingredient. Nevertheless, FDA should know of new additive proposals as a check on ignorant or foolhardy useage.

These generalizations seem simple. But their application is somewhat difficult. There has developed no consensus of opinion among chemical manufacturers and package-material firms—or even among the food companies themselves.

This confusion unquestionably has delayed the progress of food legislation. But worse, if some of the legislation proposed were adopted, it could be virtually a roadblock to many future advances in food formulation involving additives.

**Sound principles outlined**

An article in this issue of FOOD ENGINEERING (p. 51) discusses the underlying principles which can *and should* determine proper food additive policy, especially as this policy is fixed by law and by the actions of FDA.

Further effort at legislation and regulation can be expected very soon. It will affect everyone in the food industry. It may stymie or greatly reduce the benefits or comprehensive and successful research. It may discourage future research and development.

Leaders in our industry should exert their influence to avoid unsound food legislation. Appeasement of an agency by yielding on vital points is to avoid temporary embarrassment at the prohibitive price of endless curtailment of essential privileges.

Postponing trouble by compounding it for the future never has paid off in any situation, at any time.

# Look how uniform Sunbeam Bread is

## ...LIGHTNIN Mixers help make it that way!

Uniformity extends right down to the crumb, in *Sunbeam* Bread.

Even and tender, this bread is entirely free of coarse structure and large air holes. If you tear a slice in two, the break is straight, not ragged as with some bread.

**Continuous dough mixing does it**

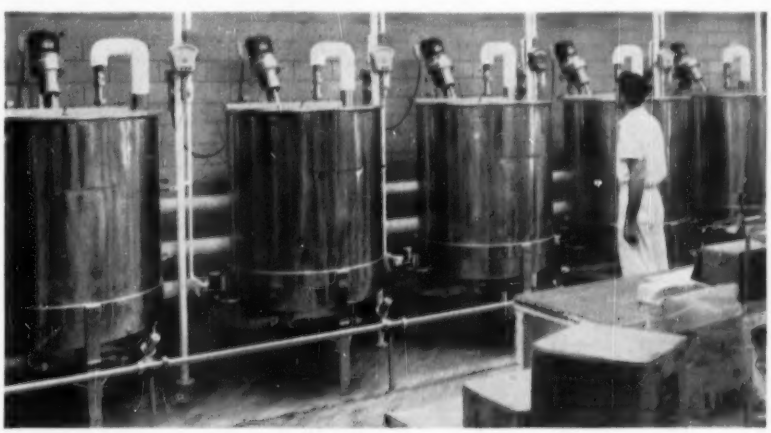
My Bread Baking Company of New Bedford, Mass., introduced uniform small-cell structure into their *Sunbeam* brand three years ago — when they started producing bread by the continuous Do-Maker Process. The process has led to the sale of more and better *Sunbeam* bread than ever before.

Every one of My Bread's broth blenders is equipped with a LIGHTNIN Portable Mixer. With gentle, thorough mixing throughout the fermentation period, the LIGHTNINs help eliminate flour scaling. *Sunbeam's* texture is smoother as a result of this thorough distribution of ingredients.

**No mixer maintenance**

Operating costs have been reduced at My Bread Baking Company through greater efficiency. LIGHTNIN Mixers have contributed to that efficiency. In the three years that LIGHTNIN Mixers have been in operation there, no maintenance has been required.

Good mixing like this doesn't just happen. It's *engineered* into the process. Where would *you* like to improve uniformity — cut processing costs — gear up for more profitable operation? Your LIGHTNIN Mixer representative will be glad to show you how you can do it with engineered fluid mixing. For fast competent help, call him — or write us today.



**BROTH IS BLENDED** at My Bread Baking Company by LIGHTNIN Portable Mixers. Each LIGHTNIN provides just-right gentle, thorough mixing during fermentation. Can your process benefit from this "engineered approach" to fluid mixing?

**FOR LATEST MIXING INFORMATION and full description of LIGHTNIN Mixers, send for these helpful bulletins:**

- ☐ B-102 Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP
- ☐ B-103 Top entering; propeller types: ¼ to 3 HP
- ☐ B-108 Portable: ⅛ to 3 HP
- ☐ B-104 Side entering: 1 to 25 HP
- ☐ B-112 Laboratory and small-batch production types
- ☐ B-109 Condensed catalog showing all types
- ☐ B-111 Quick-change rotary mechanical seals for pressure and vacuum mixing
- ☐ B-107 Data sheet for figuring mixer requirements

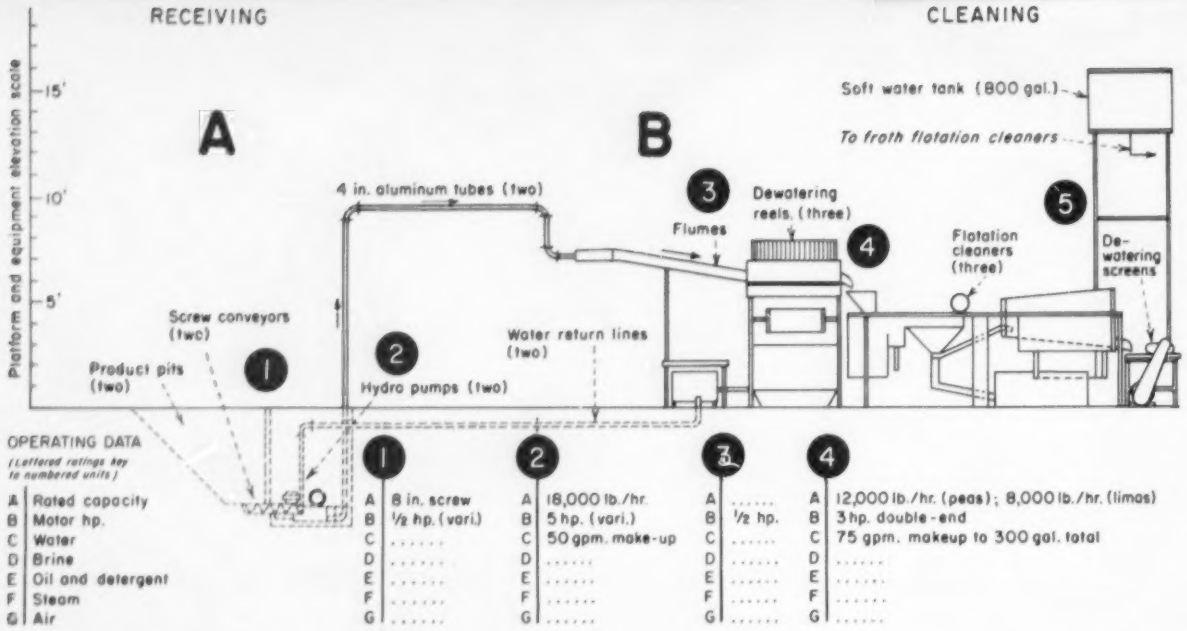
Check, clip, and mail with your name, title, company address to:

**MIXING EQUIPMENT Co., Inc., 143-n Mt. Read Blvd., Rochester 11, N.Y.**

*In Canada: Greey Mixing Equipment, Ltd., Toronto 10, Ont.*

**Lightnin® Mixers**

**MIXCO fluid mixing specialists**




# Plant Design Masters Variable Input

**Process engineers couple mechanical quality control and speedy production units to get high capacity, better efficiency from pea-and-lima freezing lines**

RAPID ADVANCES in frozen food process design are graphically illustrated in the engineering of this pea and lima bean freezing line at Stokely-Van Camp Co., Santa Clara, Calif. It clearly shows how top-flight engineering has combined essential, mechanical quality control units with fast production equipment for high capacity, efficiency, flexibility, and sanitation.

In our accompanying foldout flowsheet, operating data are directly included at the pertinent points where they apply, being keyed–by numbers and letters–to each unit operation. Just run your eye from the designated ratings (left, under flowsheet) to the number that appears under the specific machines. Here, facts are listed in tabular form.

Now, for a rundown on techniques and equipment that pace the progress in this company:

• **Bulk handling** of raw materials in metal-body (61-ton) trailers–Point (1) on flowsheet–speeds transportation from fields to plant without product damage. Hydraulic conveying from product pits–Point (2)–and from flotation cleaners–Point (4)–helps wash product as well as speed in-plant movement.

• **Quality control by machines** reduces cost of manual sorting and speeds production. A check-and-double-check cleaning and grading system is used in this process. Flotation and froth flotation cleaners–Points (4) and (6)–separate extraneous materials from the product. Peas are then graded for maturity in brine quality graders (8) before blanching.

• **A new pneumatic cleaner** (12), just installed on the line this season, removes splits, skins, and other lighter-than-product wastes following the blanch. This is an adaptation of a cleaning unit which has been used for a similar purpose in nut and raisin processing.

Following flume cooling (13), product is again quality graded in brine (15) before proceeding to the manual picking belts.

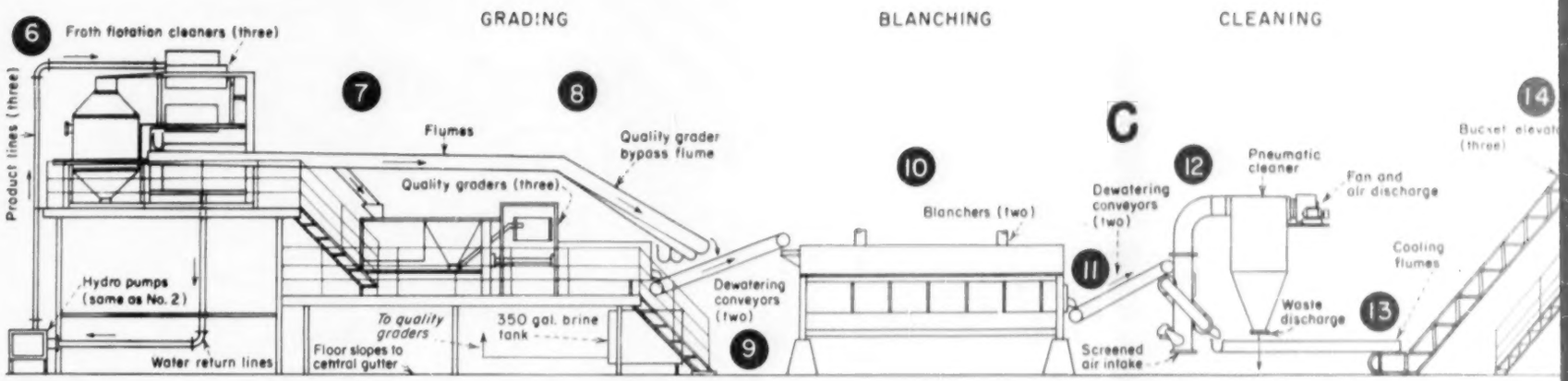
• **Top production capacity and flexibility** are achieved on what is essentially three pea and lima bean lines. The unit operations are interconnected where necessary by flumes and conveyors. And the equipment is arranged at different elevations to provide sufficient fall for the fresh water flume systems.

Lines can be split to efficiently handle fluctuating receipts of raw materials–thus "dirtying" only a minimum of equipment. When operating at full capacity, both receiving pits deliver product. Input volume is regulated by adjusting speed of the pit screw-conveyors.

Product flow from either one or both pits can be valved to three (or two, if desired) of the initial flume-water dewatering reels. From here, the proper equipment is selected throughout the lines, and flow is directed according to the volume of product being processed.

Three stainless bucket elevators–Point (19)–supply the carton and bulk tray-off fillers (21), and can be arranged to discharge directly into filler hoppers or onto a cross conveyor (20). Flow on this latter unit can be

UNFOLD HERE




| 5 | |
|---|---|
| A | ..... |
| B | 1 hp. |
| C | ..... |
| D | ..... |
| E | ..... |
| F | ..... |
| G | ..... |

| 6 | |
|---|---|
| A | Depends on quality of raw product |
| B | 10 hp. (froth pump), 1 hp. (treater pump), ½ hp. (reels) |
| C | Depends on quality of raw product |
| D | % variable according to raw product quality |
| E | 1½–3 gal. oil, 12 oz. detergent per 125 gal. soft water (peas) |
| F | 3–4½ " " 16 " " " " " " " " (limas) |
| G | 18 psi. |

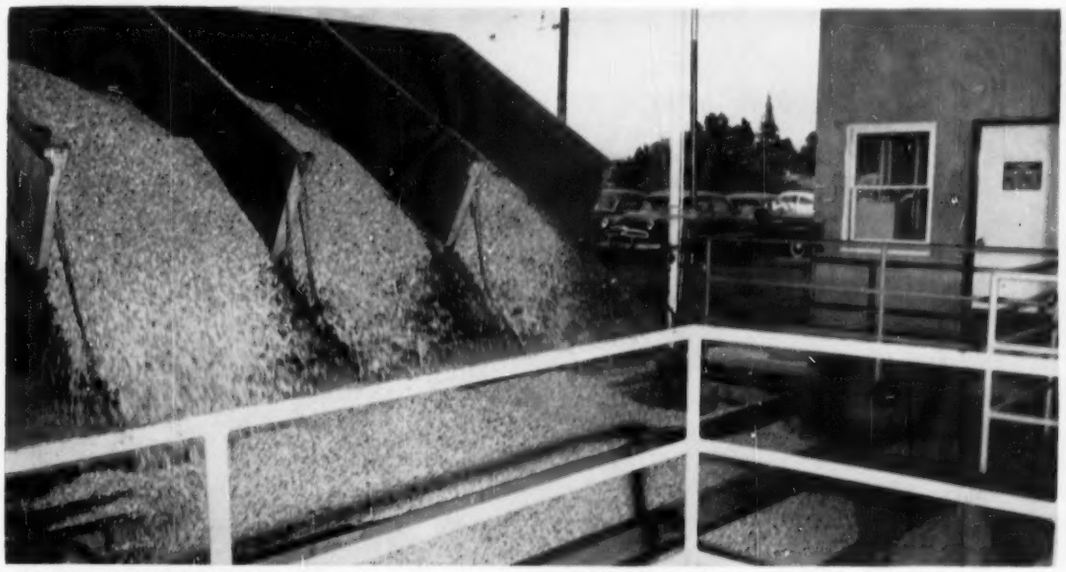
| 7 | |
|---|---|
| A | .... |
| B | ..... |
| C | 75 gpm. |
| D | ..... |
| E | ..... |
| F | .... |
| G | ..... |

| 8 | |
|---|---|
| A | 10,000 lb./hr. (peas); 6,000 lb./hr. (limas) |
| B | 3 hp. (double-end drive) |
| C | ..... |
| D | (According to raw product quality, the 350 gal. brine tank is made-up 10-12 times/day |
| E | ..... |
| F | ..... |
| G | ..... |

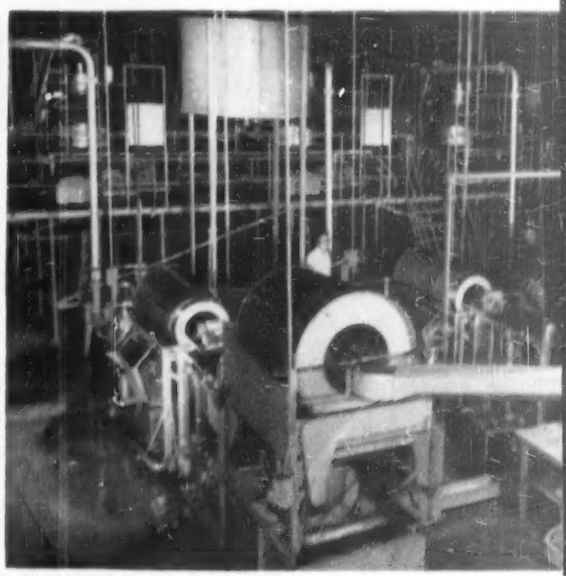
| 9 | |
|---|---|
| A | ..... |
| B | ½ hp. |
| C | ..... |
| D | ..... |
| E | ..... |
| F | ..... |
| G | ..... |

| 10 | |
|---|---|
| A | 12,000 lb./hr. (peas); 8,000 lb./hr. (limas) |
| B | 2 hp. (vari.) |
| C | 10 gpm. make-up |
| D | ..... |
| E | ..... |
| F | 120 psi. to water heating coils (water 210 F.) |
| G | ..... |

| 11 | |
|---|---|
| A | .... |
| B | ½ h |
| C | |
| D | |
| E | |
| F | |
| G | |



**A BULK TRANSPORT** of raw materials by trailers eliminates lug boxes and bins. Metal bodies are hinged to chassis and easily dumped by lift truck. Product slides from divided trailer into product pit, then is screw-conveyed to hydro-pump.



**B ALUMINUM PIPE** delivers product to flumes. Peas or lima After another dewatering, product is pumped to froth flotati

diverted to retail or institutional-size carton fillers, or to the bulk tray-off hopper. Packages pass through wrappers (23) and tray-off tables on their way to the freezers.

• **Food sanitation principles** were closely followed—not only in the more obvious design and location of processing equipment, but even in floor construction.

From each side of the lines, a concrete floor-slab slopes to a large, central, grill-covered gutter. At points where equipment normally discharges waste, or where liquid overflow is possible, the area is surrounded by a 6-in. concrete curb to prevent flooding of other areas.

For employee comfort, worker platforms are raised above the main concrete floor and are covered with duckboards.

Likewise, modern sanitation methods—utilizing high-pressure hot water and/or steam—are used to clean equipment. All these features afford considerable savings in cleanup time.

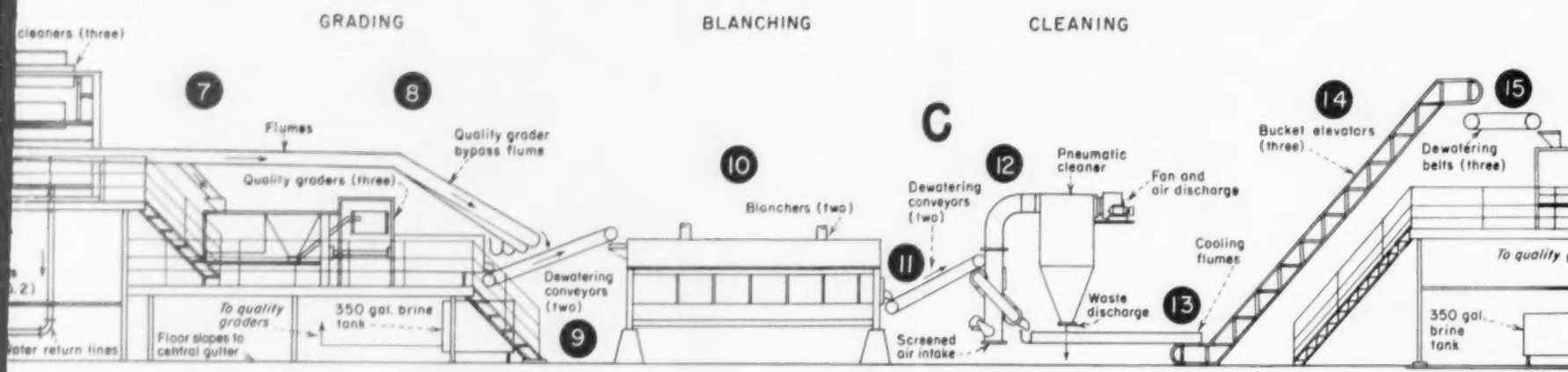
*FE gratefully acknowledges the help of Walter Helin, Chief Engineer, Stokely-Van Camp Co., for his help in preparing this flowsheet.*

**Process Equipment Suppli**

*Hydro pumps—Scott Viner Co., Columbus, Ohio*
*Dewatering reels—Scott Viner Co.*
*Flotation washers—Geo. J. Olney Co., Westernville, N. Y*
*Separating screens (Vibra-Lux)—Scott Viner Co.*
*Froth flotation cleaners—Key Equipment Co. Milton Freewa*
*Quality graders (straight-line)—Geo. J. Olney Co.*
*Blanchers ("Whirlpool")—Huntley Mfg. Co., Brocton, N. Y*
*Pneumatic cleaner—Commercial Mfg. & Supply Co., Fresn*
*Bucket elevators—Food Mchy. & Chem. Corp., San Jose,*
*Carton fillers ("Marapak")—Marathon Paper Co., Menash*
*Wrapping machines (Model FFH)—Package Mchy. Co.*

*Other equipment fabricated or designed by Stokely-Van*

FE PICTURE FLOWSHEET NO. 95




| | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| A | .... | 10,000 lb./hr. (peas); 6,000 lb./hr. (limas) | ..... | 12,000 lb./hr. (peas); 8,000 lb./hr. (limas) | ..... | ..... |
| B | ..... | 3 hp. (double-end drive) | ½ hp. | 2 hp. (vari.) | ½ hp. | 7½ hp. (vari.) fan 1 hp. |
| C | 75 gpm. | ..... | ..... | 10 gpm. make-up | ..... | ..... |
| D | ..... | (According to raw product quality, the 350 gal. brine tank is made-up 10-12 times/day | ..... | ..... | ..... | ..... |
| E | ..... | ..... | ..... | ..... | ..... | ..... |
| F | .... | ..... | ..... | 120 psi. to water heating coils (water 210 F.) | ..... | ..... |
| G | ..... | ..... | ..... | ..... | ..... | 5,240 cfm. (baby); 6,[illegible] limas) cfm. regulated |

ends on quality of raw product
p. (froth pump), 1 hp. (treater pump), ½ hp. (reels)
ends on quality of raw product
ariable according to raw product quality
3 gal. oil, 12 oz. detergent per 125 gal. soft water (peas)
" " 18 " " " " " " (limas)
si.

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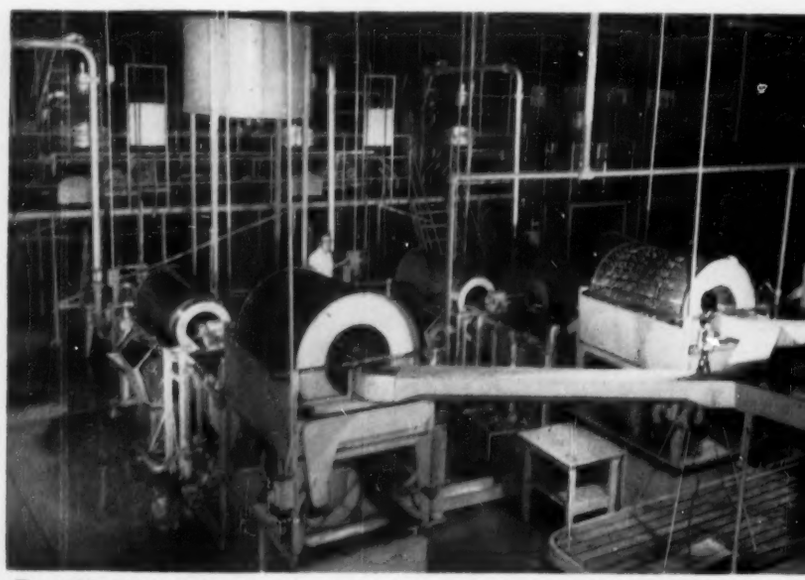

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FE PICTURE FLOWSHEET NO. 95

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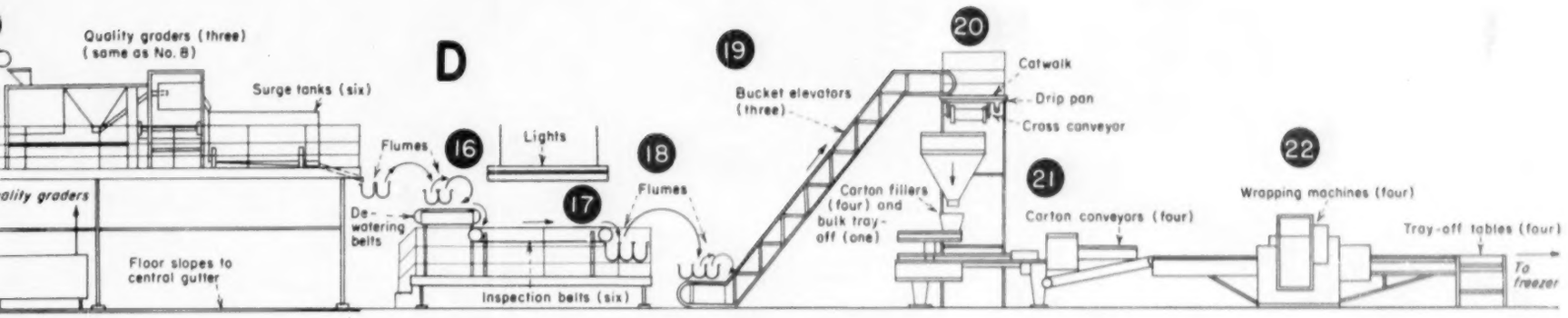
Quality graders (straight-line)—*Geo. J. Olney Co.*
Blanchers ("Whirlpool")—*Huntley Mfg. Co., Brocton, N. Y.*
Pneumatic cleaner—*Commercial Mfg. & Supply Co., Fresno, Calif.*
Bucket elevators—*Food Mchy. & Chem. Corp., San Jose, Calif.*
Carton fillers ("Marapak")—*Marathon Paper Co., Menasha, Wis.*
Wrapping machines (Model FFH)—*Package Mchy. Co. Longmeadow, Mass.*

Other equipment fabricated or designed by Stokely-Van Camp Co.

GRADING INSPECTING FILLING WRAPPING

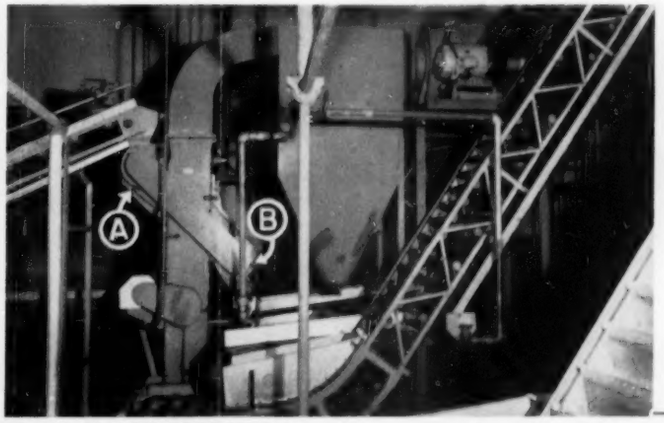


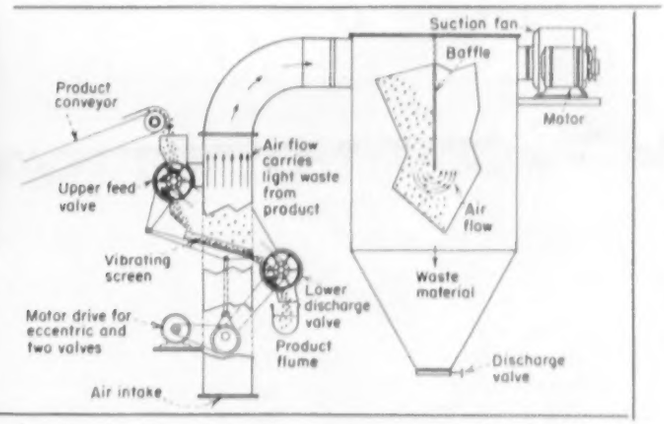

| | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|
| A | ..... | 12 in. s.s. buckets | ..... | ..... | ..... | ..... | 16 in. s.s. buckets | ..... | (3 to 10 oz. at 160-180 cartons/min. and 2½-3 lb. at 70-80/min. | 1 hp. |
| B | ..... | 1 hp. gearhead | ½ hp. | ..... | ½ hp. | ..... | 1 hp. (gearhead) | ½ hp. | 10 oz. unit, ¾-1½ hp.; 2½-3 lb. unit, 1½ hp. | ..... |
| C | 200 gpm. | ..... | ..... | 125 gpm. | ..... | 200 gpm. | ..... | ..... | ..... | ..... |
| D | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| E | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| F | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| G | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

...1 hp. (vibrator and valves)

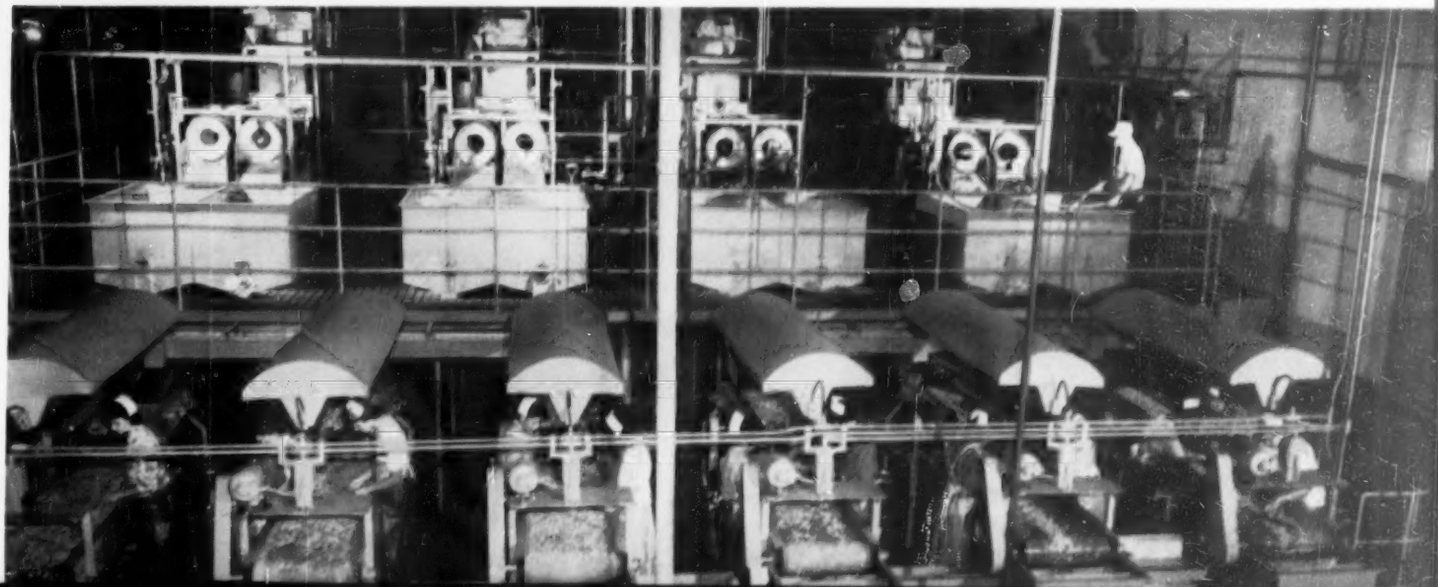
...y); 6,500 cfm. (Fordhook ...iated by product quality

...watering reels and flotation cleaners. ...latform (rear).



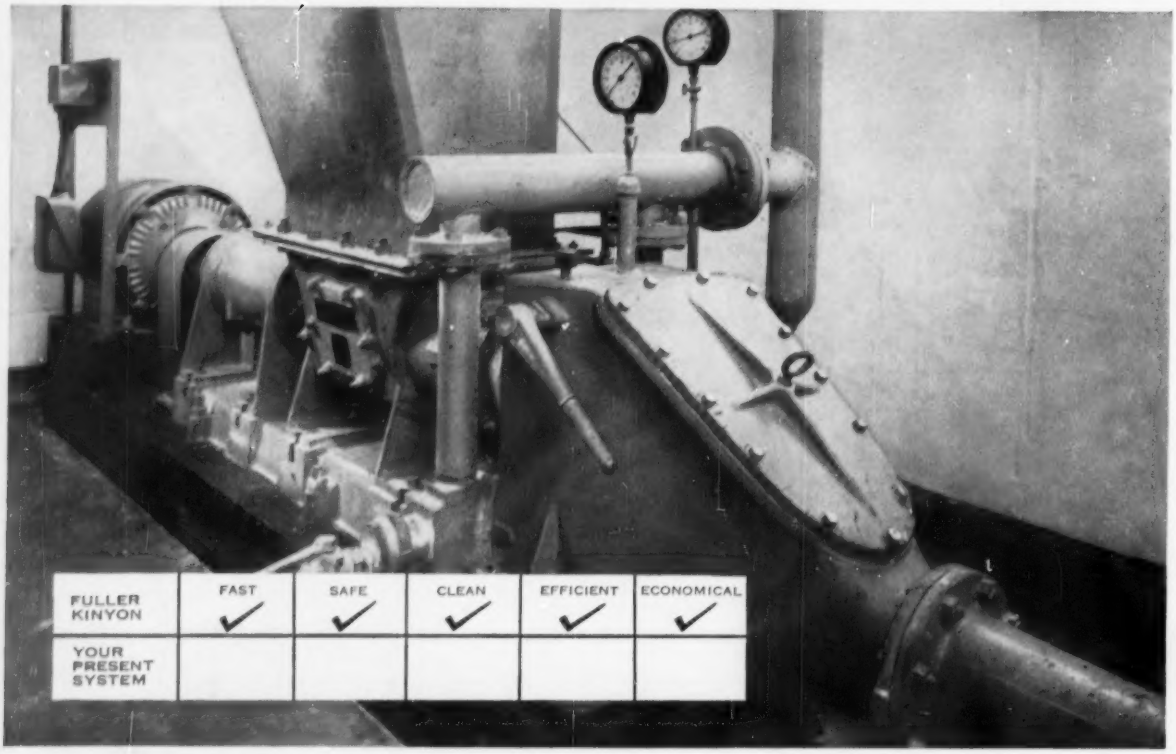




**C** BLANCHED PRODUCT drops into pneumatic cleaner (left above) through entry valve (A). An air stream removes splits and skins, and product discharges through lower valve (B) into cooling flumes. Waste material is dumped on floor (every 30 min.), and washed into gutter. Diagram (right) shows operating details and action in the separating chamber, where chaff leaves air-current.



**D** QUALITY GRADERS (on rear platform) separate product, which is flumed to inspection belts. Then other flumes speed it to bucket elevators that feed the fillers.

# How many can't you check...




Fuller-Kinyon pump conveying flash-dried starch to dextrine or starch bagging department at rate of 12,500 lb. an hour. Conveying distance 600 feet.

## . . . against your present dry pulverized materials handling method?

If there's just one of these practical features that you *can't* claim, you can be sure that its lack is adding a substantial amount to your annual conveying costs. To move bulk Portland cement, pulverized coal, limestone dust, flue dust, fly ash, starch, pulverized phosphate rock or any other dry materials of similar consistency, a Fuller-Kinyon System designed specifically for your plant will provide the best combination of efficiency and economy available and also afford the "extras" of safety, speed and cleanliness.

**A FULLER-KINYON SYSTEM:**

- *harnesses air to do the work
- *eliminates fire and explosion hazards
- *operates anywhere a pipeline can be run
- *entails no complicated or costly installation factors
- *reduces maintenance sharply
- *can be operated by one man
- *eliminates spillage—waste

Proof that these advantages have been long recognized is the fact that one or more Fuller-Kinyon Systems are serving in 98 per cent of the nation's cement mills as standard primary conveyors. Take a leaf from this service record. Get the facts as they apply to your plant and put Fuller's 30 years of pneumatic conveying experience to work for you.

FULLER COMPANY GENERAL AMERICAN TRANSPORTATION

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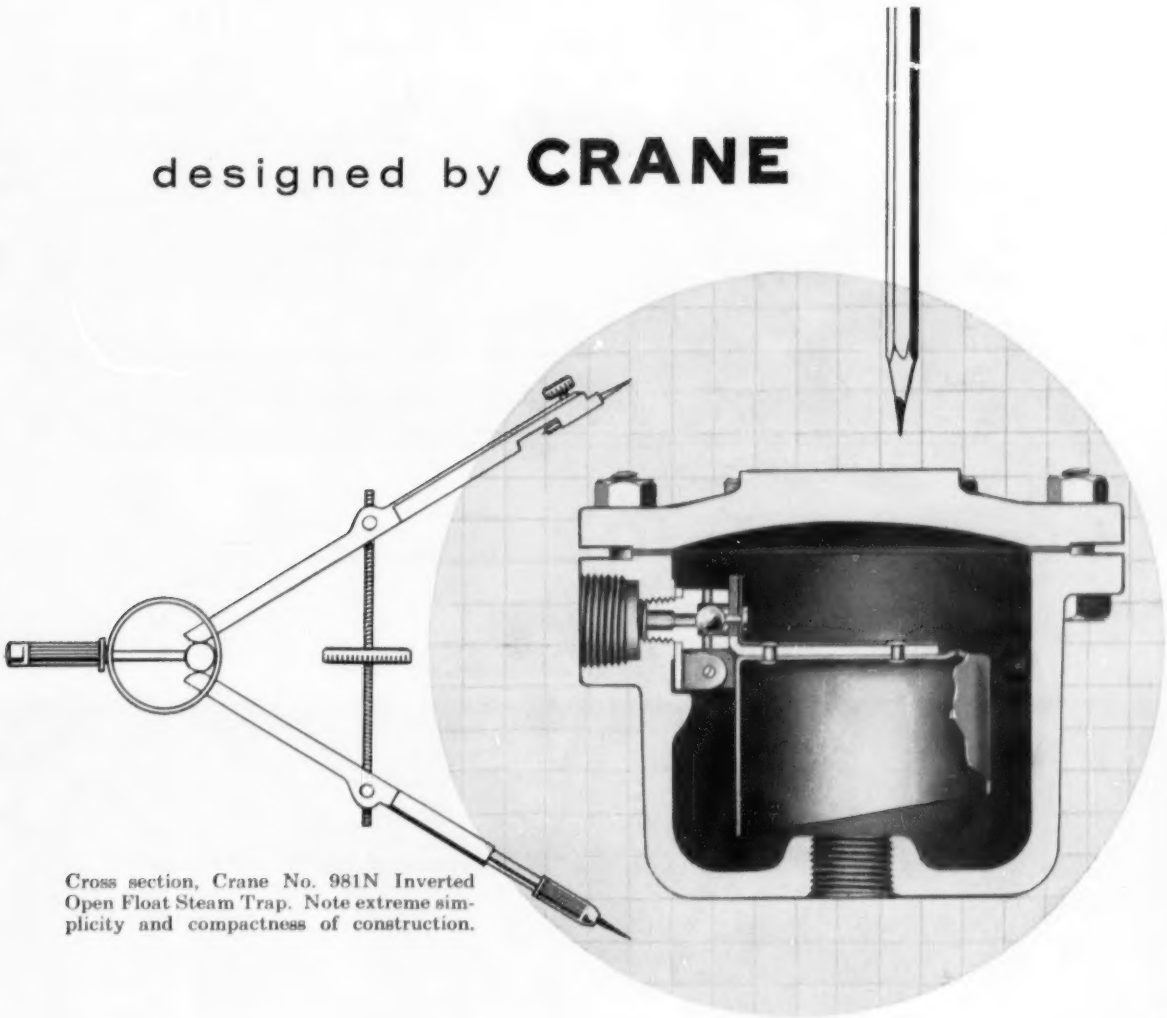
designed by **CRANE**



Cross section, Crane No. 981N Inverted Open Float Steam Trap. Note extreme simplicity and compactness of construction.

to keep your steam lines

# HOT, DRY and EFFICIENT

With an apparatus heated or operated by steam, you'll save fuel and insure operating efficiency by installing Crane Inverted Open Float Steam Traps—designed to drain condensate accumulation automatically and instantly.

The exceptionally rugged, simple construction of Crane Steam Traps provides high discharge capacities in relation to their size—permitting more compact installations. They are available in working pressures from 1 to 300 pounds saturated steam, sizes ½ to 1 inch.

For literature giving ordering and installation instructions, see your Crane Representative or write to address below.

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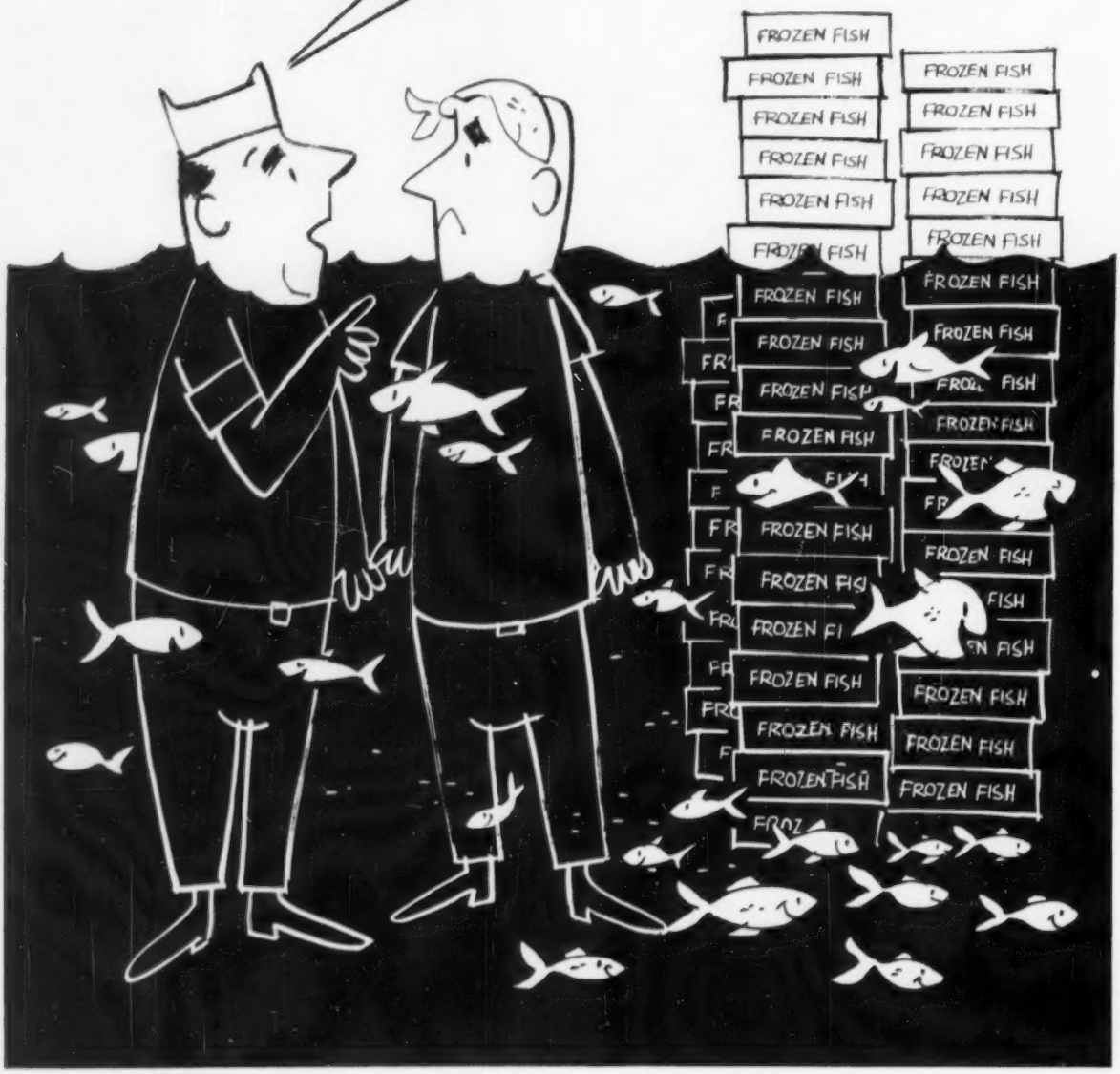


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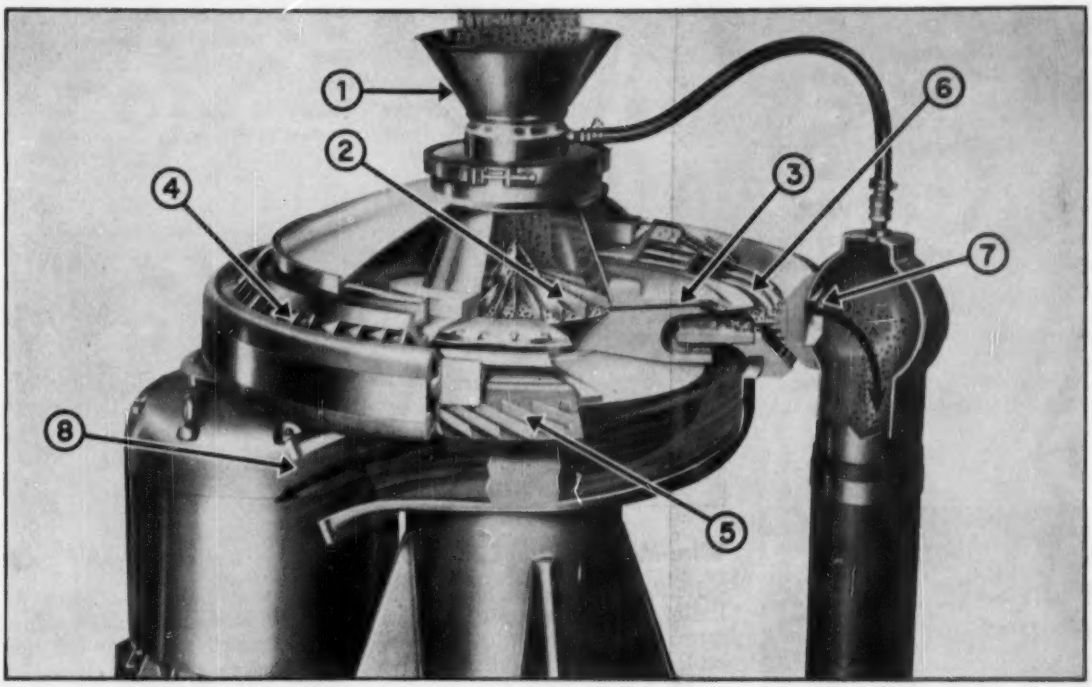
CUT OUT AND FILE

# NEW EQUIPMENT & SUPPLIES




## Vortex-Type Classifier Ups Solids-Separation Efficiency

Combining a sharp cutpoint with high capacity and yield, a new line of compact classifiers offers top efficiency in separating a variety of dry powders in the 10-125 micron range.

Potential applications include classifying of flour, sugar, salt, starches, ground grains, cocoa, and chocolate.

Known as Super Classifiers, units are available in four sizes with capacities ranging from 1,000-30,000 lb. per hr. Cutpoint is sharp at high capacity regardless of feed rate or size distribution. And fine fractions obtained (top size, 15-20 microns) will have no more than 0.01-0.4% of 325-mesh screen residue.

These results have been verified by a highly accurate particle-size analyzer (Micromerograph), developed during the course of designing the classifier. Instrument gives readings (to ±3%) in 15-20 min.

Machine's superior performance is attributed to the air-vortex principle employed. In operation, feed enters through a stationary intake funnel (1 in photo), and falls onto an impeller-like rotating distributor (2). Latter's blades deflect the powder outward into feed tubes (such as 3), and discharges it through nozzles into the center of the classification zone.

Simultaneously, air enters this zone through top and bottom vanes (4, 5), which provide vortices of the proper angle for the desired cutpoint.

Particles coarser than the cutpoint are carried outward where they contact coarse collector rings (6). Latter guide the particles around the classifier until they reach the outlet port (7), and are discharged to a built-in airlock valve (not shown).

Meanwhile, particles finer than the cutpoint move inward according to the vortex principle, and are delivered to the fines discharge scroll (8). A collector, downstream of this scroll, removes fines from the air stream. And beyond the collector is an exhauster that induces airflow through the entire system.

Classifier is designed to minimize the effects of abrasion and wear. In the few places where powder contacts the walls at high velocity, such as feed tubes, readily replaceable inserts are provided for economical maintenance. Also, the spindle is completely sealed to eliminate entry of particles.—*The Sharples Corp., 2300 Westmoreland St., Philadelphia.*

Circle 115A on Reader Service Card


**INDEX**

**Chemicals** ..... 126
**Ingredients** ..... 129
**Briefs** ..... 130
**Applications** ..... 132


### Metal Parts Resurfaced With Steel-Plastic Mix

Numerous applications are cited for an easily used plastic steel, a combination of 80% steel and 20% plastic.

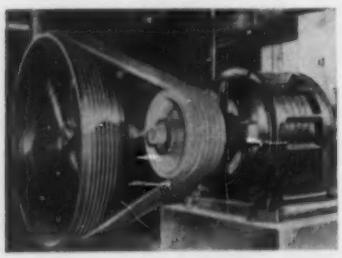
Known as Devcon, it may be used for rebuilding broken machinery,

filling large holes in castings, building up worn metal surfaces on machine tools, and repairing stripped threads and bearings.

Material sets to a rigid steel-like mass two hours after addition of a hardening agent. Once hard, it can be sawed, drilled, threaded, or ground with ordinary metal-working tools.

Product is available in two forms: A putty type which can be applied to a vertical surface without running, and a viscous liquid which can be poured. Both materials have a compressive strength of about 18,000 psi., and are resistant to most acids, alkalis, and chemicals.—*Devcon Corp., Danvers, Mass.*

Circle 115B on Reader Service Card



## High-Capacity Belting Cuts Operating Costs

To cut drive costs, this new V-belt offers greater strength for increased power transmission, plus a special oil-resistant cover to prolong belt life.

Called "Powerflex", it permits use of fewer belts and narrower sheaves in handling a load. Units are also available with static-conducting covers. A and B section belts are of nylon-laminated construction, while C, D, and E sections use rayon grommets.—*Thermoid Co., 200 Whitehead Rd., Trenton, N. J.*

Circle 116A on Reader Service Card

## Speed, Compactness Cited For Vertical Conveyor

In-plant handling of packages or bagged materials may be sped with use of a new vertical conveyor that takes only 6 ft. of floor space.

Designated Power-Curve Elevator, it lifts or lowers packages at any angle or to any level. Applications include movement from production areas to storage or to cross conveyors, unloading operations, and palletizing.

Bags travel at 140 fpm. between independently powered conveying surfaces, and firm gripping improves their shape for stacking. Unit can be instantly reversed to lower bags at controlled speeds.—*Power-Curve Conveyor Co., 2185 S. Jason St., Denver 23, Colo.*

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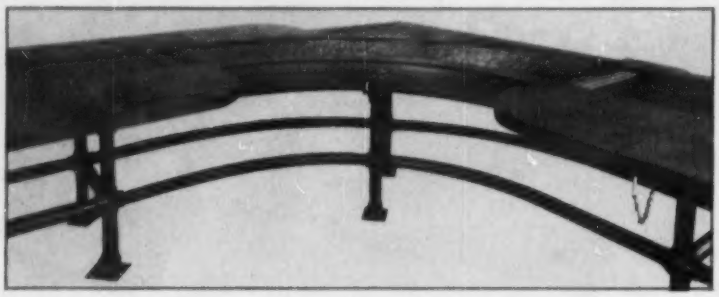


## Wire-Mesh Curve Conveyor Eliminates Rollers

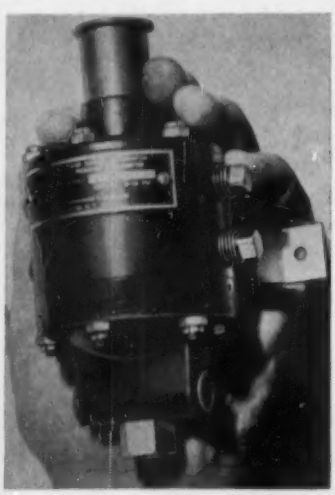
Here's a new solution to the problem of conveying material around a corner without using wheels or tapered rollers. It's a horizontal-curve conveyor employing a wire-mesh belt woven on a taper corresponding to the radius of curvature.

Standard unit (Wire-O-Veyor) consists of a complete conveyor section with steel framework, tubular supports, and adjustable take-ups. Drives and controls are available, or the section may be powered from adjoining conveyors. The belt is supplied in a variety of metals and styles, takes loads to 2,000 lb.

Dual multiplane side chains carry crossbars which extend through the fabric, and each chain is driven by an intermeshing sprocket. Belts may be supported on full-width slider beds, skid rails, or rollers.

The curve comes in a range of widths and radii, and may be installed horizontally or at an angle. Attachments can be added if the belt is to convey materials on an incline.—*Wiretyer Corp., 230 Warburton Ave., Hawthorne, N. J.*

Circle 116C on Reader Service Card



## Compact Unit Economizes Flow Transmission

This low-cost pressure transmitter is offered as a cost-accounting aid for the plant in which consumption of steam, water, or air goes unchecked for lack of economical instrumentation.

A fixed-range differential unit (200 TD), it also provides control of processes requiring sensitive transmission readings to an indicator or recorder. Typical applications are control of liquid level, consistency, and air or gases up to 10 psi.

Instrument can easily be pipe-mounted and all connections are ¼-in. internal NPT. Its diaphragm is Neoprene-impregnated nylon, while

body material is brass. Unit measures 6½x3 in., weighs 4½ lb.

Specifications: Maximum working pressure, 150 psi.; temperature 150F; air-pressure supply, 20 psi.; air consumption, 0.10 standard cu. ft. per min.; output-pressure range, 3-15 psi.; calibration accuracy, 1%; sensitivity, 0.1%; ranges, 0 to 50, 100, 200 and 300 in. of water.—*Taylor Instrument Cos., 95 Ames St., Rochester 1, N. Y.*

Circle 116D on Reader Service Card

## Stacked Bread Racks Nest for Storage

These welded-wire racks are designed to mesh when empty and to stack neatly when they are filled with bread.

At the bakery, the steel racks (Nestaways) are filled with loaves as they leave the wrapping machine. Units are then delivered to retail outlets. Major advantage is the small storage space racks take when not in use. As shown in the photo, 56 empty units can be stacked in the space required to acommodate twelve of them when filled.

This is advantageous in the bakery, on delivery trucks during return trips, and in stores where filled racks may be left for customer consumption. In addition, units are termed highly durable in normal use.—*Nestaway Div., Mid-West Metallic Products, Inc., 450 Film Bldg., Cleveland 14.*

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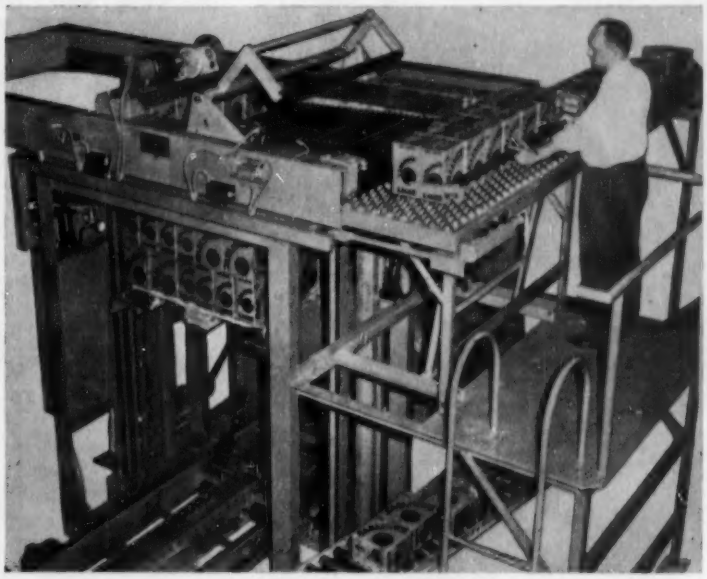


## Semi-Automatic Unit Palletizes Cartons, Flattened Bags

With the pattern-forming function controlled by an operator, this new unit stacks either cartons or flattened bags onto pallets, ready for pickup by fork truck.

Known as Semi-Automatic Pallet Loader, it employs a series of mechanical, electrical, and pneumatic components for versatility and smooth operation. Basically, the unit consists of integrated systems for handling empty pallets, containers, and full pallets.

In operation, stacks of empty pallets (usually 10) are loaded into a pallet dispenser by fork truck. Single pallets are then dispensed to transfer chains, the operation being interlocked with unit's electrical system. Transfer chains move a pallet into the full-lift platform, which immediately rises to carry it into loading position directly under an apron.

Meanwhile, containers are conveyed directly onto a ball-transfer table, where they are arranged in rows by an operator standing on the platform. Operator then pushes containers sideways onto an accumulation table, from which they flow by gravity onto the apron.

When a layer of containers has been arranged on the apron, operator momentarily depresses a button which causes the apron to withdraw and deposits the layer on the pallet below. Then, the lift lowers just the height of the cartons, and the apron returns it to receive the next layer.

The accumulation conveyor permits the operator to continue forming a pattern while the apron completes its cycle. Apron's cycle time is short, and space only for a single row of cartons is required.

When required number of carton layers has been deposited on a pallet, the lift drops to its bottom position and places the fully loaded pallet on discharge chains. Then, discharge and transfer chains carry the loaded pallet out of the machine, while moving an empty pallet onto the lift platform.—*Mathews Conveyor Co., Ellwood City, Pa.*

Circle 117B on Reader Service Card

## Plastic Insulation Cover Has Slide Fastener

Insulation for pipes, ducts, and cables may be efficiently protected by a new plastic covering of vinyl film (Krene). Moreover, a slide fastener is provided for easy access to the line at almost any point without damage to the cover.

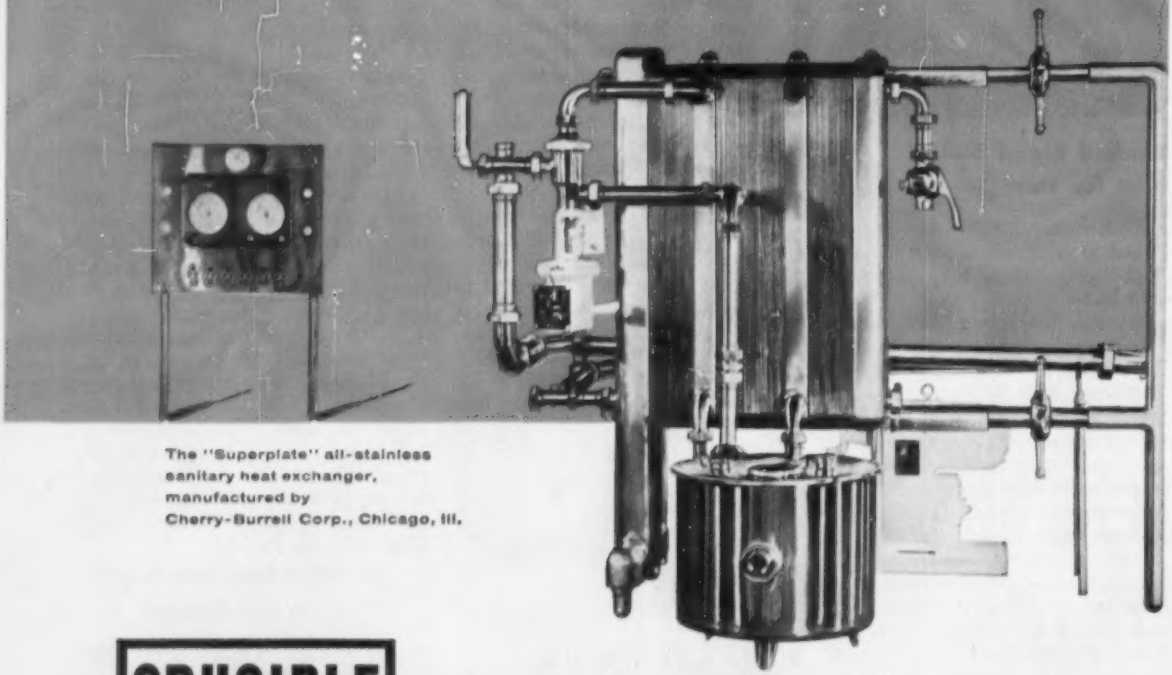
Designated "Protektinsul", it offers good moisture-vapor resistance,

# why STAINLESS for this fluid-food heat exchanger?

Plate-type heat exchangers like this one, made practical by *stainless steel* construction, have become workhorses of the food processing industry. Liquids traveling through the unit at high velocity make *stainless* almost mandatory.

In fact, due to its inertness, corrosion resistance, easy cleaning and ability to stand high temperatures, *stainless* is being used more and more for all types of heat exchangers, evaporators, spray dryers, vacuum pans, and milk handling equipment.

It not only makes for more efficient processing, it actually cuts operating costs. For *stainless* equipment far outlasts other types, and it requires a minimum of costly maintenance. Next time you're buying equipment, be sure it's *stainless*. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



The "Superplate" all-stainless sanitary heat exchanger, manufactured by Cherry-Burrell Corp., Chicago, Ill.

**CRUCIBLE** first name in special purpose steels

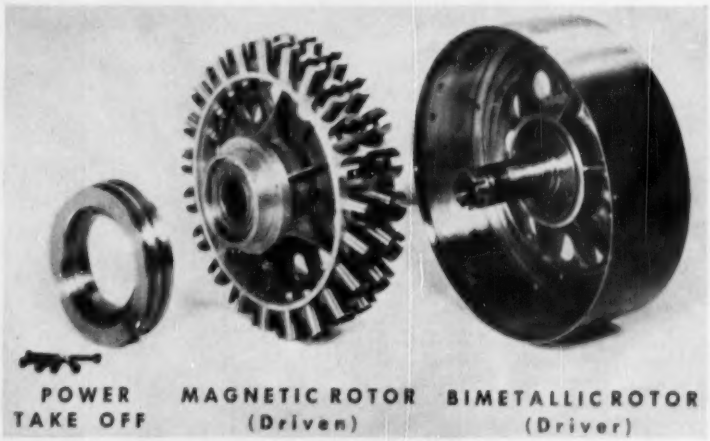
**Crucible Steel Company of America**

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

durability, and low installation cost, and will not mould, mildew, or support combustion. Light weight and flexibility of the cover enable easier covering of pipes close to the ceiling or in other hard-to-reach spots.

Coverings are available in lengths up to 100 ft. and can be used on pipes ranging from ½-33 in. dia. They are produced in colors to fit into an identification system.—*Miracle Adhesives Corp., 214 E. 53 St., New York City 22.*

Circle 117C on Reader Service Card




## Magnetic Drive Provides Many Advantages

This unit provides a flexible slip-type drive between a motor and its load without contact between the driving and driven rotors—an air gap always exists between them.

Such a design permits variations which cover a wide range of transmission applications involving synchronous drives, variable speed—variable torque output, or variable speed—constant torque output.

Advantages cited for the equipment (Magnetic Drive) include smooth power pickup, overload protection, 95% efficiency at rated horsepower, and minimum vibration and wear. Units are available in a range from fractional to 50 hp.

The drive consists of two parts: A magnetic rotor to which permanent magnets are attached; and a bimetallic rotor, which is a copper-faced, steel cylinder perforated with steel rivets. Rotors are mounted face-to-face. If either rotor is driven, a torque is induced in the other through eddy currents.

Unit can be run in full stall (100 % slip) indefinitely without harming the motor or drive. Operating range is −60 to 250F. In the stalled position, heat accumulates in the bimetallic rotor only, and about 5 min. of running at full load restores normal temperature. — *Whitney Chain Co., 237 Whitney, Hartford, Conn.*

Circle 119A on Reader Service Card

### Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Readers' Service Postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Readers' Service Section.

## Unit Continuously Gages Clarity of Liquids

By efficiently measuring turbidity of liquids and suspensions in the range of 0.05-250 ppm., a new instrument provides continuous monitoring of clarity in fluids, such as the discharge of a filter press in brewing operations.

Designated "Turbistat," it employs a dual-beam system in which light scattered by suspended particles is compared with that transmitted by the fluid. Unit may be coupled to a side stream or used directly in any stream up to 3-in. dia. A special servo system maintains optical balance to eliminate errors due to drift, lamp aging, or temperature changes. —*Baird Associates-Atomic Instrument Co., 33 University Rd., Cambridge 38, Mass.*

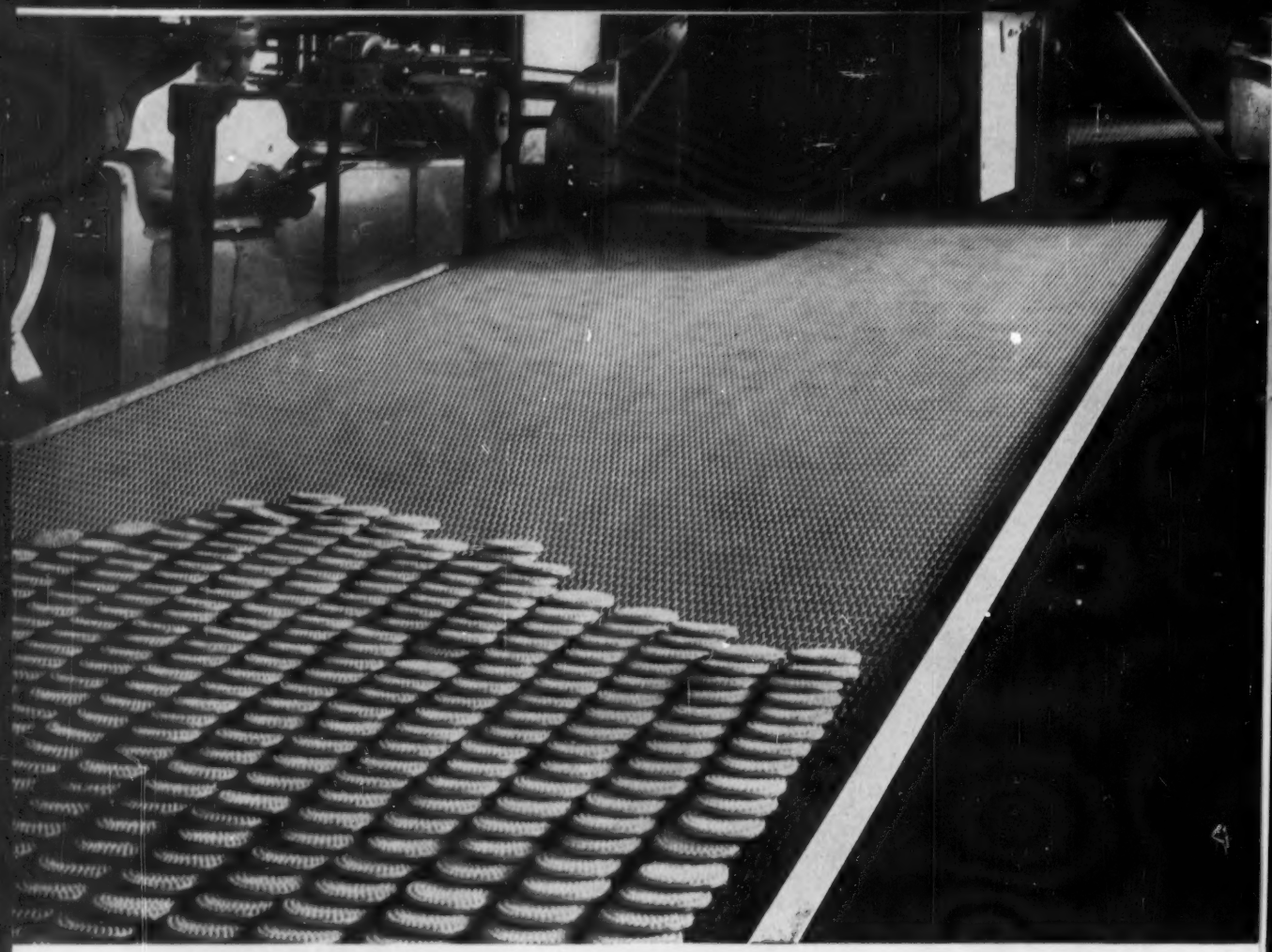
Circle 119B on Reader Service Card

## Accurate Sp. G. Indicator Provides Remote Reading

This specific-gravity indicator offers an accuracy of 0.001 Sp. G unit (with interpolation to 0.0005 Sp. G. unit), plus simplified installation, operation, and maintenance.

Called No. 1561, it operates on the principle of a differential bubbler. Unit has two static pick-up tubes (one a pre-determined distance above the other) within the vessel containing liquid to be tested. Two additional tubes are installed in a small reference tank within the compact instrument.

Latter is filled with a liquid of a known specific gravity which is as close as possible to that of the tested liquid. Both sets of static tubes



Millions of Megowen Educator cookies and crackers are cooled every day on Wissco Belts. The open mesh design assures rapid cooling because it exposes the top, bottom and sides of each item to cool air, thus greatly retarding inner package deterioration.

# FAMOUS NAMES
## *ride on* WISSCO BELTS
## *Megowen Educator Food Company • Lowell, Mass.*

*The story of Wissco Belts is best told by their users.* For example, one of the nation's leading bakers, Megowen Educator Foods, reports:

**"Our six Wissco stainless steel spiral belts have enabled us to double the shelf-life of our products by assuring rapid, complete cooling before packaging."**

According to Mr. W. E. Megowen, Vice President in Charge of Production, "This doubled shelf-life has enabled Megowen Educator Foods to eliminate costly merchandising operations including frequent service calls on dealers and a high percentage of returned goods.

"An additional advantage—extremely important in the consumer-sensitive food market—is that the efficient Wissco Belt cooling operation has greatly reduced the possibility of poor quality merchandise reaching the customer.

"Since we started using them in 1938," concludes Mr. Megowen, "our Wissco Belts have helped us maintain an uninterrupted production flow. For temperature resistance, durability and ease of maintenance, we consider Wissco the best available belt."

Chances are that Wissco Belts can help you solve your processing and conveying problems, too. Get the complete story without obligation... just contact your nearby CF&I sales office.

**WISSCO BELTS**
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

THE COLORADO FUEL AND IRON CORPORATION • Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION • Atlanta • Boston • Buffalo • Chicago • Detroit
New Orleans • New York • Philadelphia • CF&I OFFICES IN CANADA: Toronto • Montreal

4537

terminate in a multi-port valve which can connect either set of tubes with the indicating system. Latter consists of a combined vertical and inclined manometer equipped with an adjustable well and safety overflow. It has two identical bubbler generators, each consisting of a flowmeter and needle valve, one for each set of static tubes.

All functional parts are conveniently mounted on the rear of the instrument panel, while adjustments are made from the front. Parts are accessible by swinging open the hinged panel door. Entire front panel can be removed from the indicator cabinet by a ¼ turn of four fasteners. The three transmission lines terminate in a triple terminal and are easily connected or disconnected.—*Petrometer Corp., 43-22 Tenth St., Long Island City 1, N. Y.*

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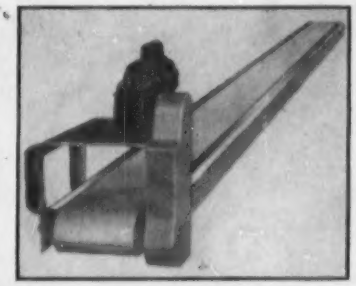
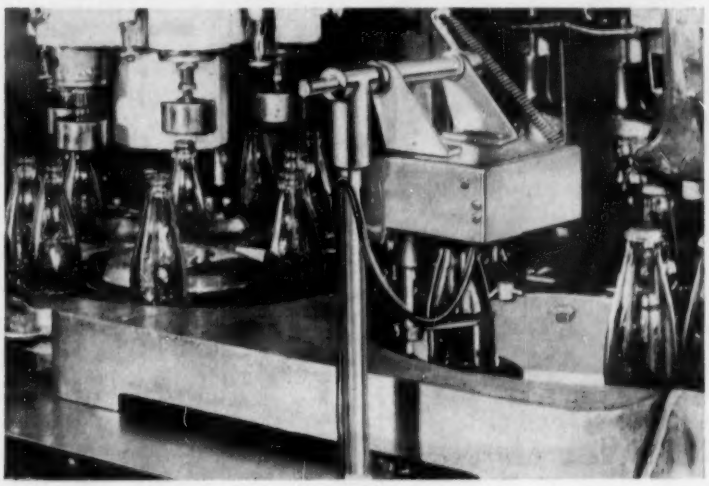


## Removable Slider Bed Simplifies Cleaning

To boost sanitation in cutting rooms and packaging departments, this horizontal conveyor employs a removable slider bed that is easily accessible for cleaning of all exposed surfaces.

The bed is a simple flanged cover which, by slipping under the belt, is mounted over the top surface of the main frame. Belts are available in a variety of widths and for various operating conditions, such as cold, wet, and oily.—*Metzgar Conveyor Co., 412 Douglas St., N. W., Grand Rapids, Mich.*

Circle 121B on Reader Service Card



## High-Speed Unit Detects Uncapped Bottles

By spotting bottles that pass the crowner uncapped, this electronic crown detector guards against product waste and minimizes danger of damage to equipment. Providing early warning of a cap jam, it also cuts filler downtime and eliminates manual inspection of the crowning operation.

Known as RCA, unit is easily installed on any bottling equipment. It inspects 6-, 10-, and 12-oz. bottles at up to 410 per min.; quarts, at up to 250 per min. Furthermore, it is adjustable for the various types of crowns or caps used in the food industry.

Detection is performed magnetically by a sensing device at the crowner's outfeed. It can be set to sound an alarm or stop the production line, or both, upon spotting an uncrowned bottle. In addition, unit has a built-in "memory" which enables it to differentiate between and respond to major and minor capping trouble on the line.

When an uncapped bottle passes through the sensing device, the detector sounds an alarm and keeps the line running, but it remembers the uncapped bottle for 4 sec. Should additional uncrowned bottles be detected during the 4-sec. interval, indicating more serious trouble, unit automatically shuts off the filling machine.

Designed for long service life, detector has only one moving part, an arm that contacts bottles at a safe distance from the neck to avoid tipping. The sensing device is 6½x4¼x2½ in., weighs 7½ lb., and has an anti-jam device which swings it out of the way should bottles ride "high" into the inspection area.

Detector's control unit can be located remotely for protection from dripping liquids. Also available is a special controller for operations employing air-operated fillers.—*Radio Corporation of America, Camden 2, N. J.*

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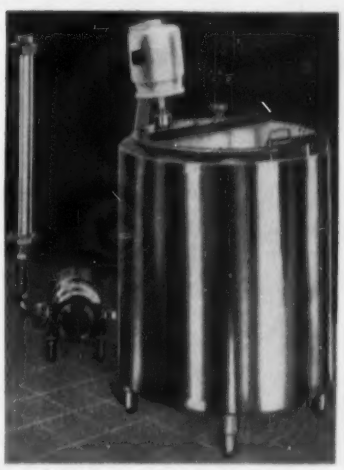


## Emulsifier Eases Batching Of Baker's Small Items

Incorporating means for blending, emulsifying, and filtering, this assembly is designed to simplify handling of the baker's small ingredients —yeast, sugar, salt, malt, syrups, and vitamins.

Known as "Ingrediator", its twin

# Concave sides make V-belts last longer

The sides of every Gates V-belt (Fig. 1) are concave—a precisely engineered curve that greatly increases V-belt life. Here's why:

On the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave evenly, and wear is distributed evenly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

## Make this simple test

Take a straight-sided belt (Fig. 2) and bend it. Feel the sides at the bend; they bulge out. Now picture this bulge in the sheave groove (Fig. 2-A). It is easy to see that the belt makes uneven contact at points indicated by arrows. Naturally, wear is greater at these points. Uneven wear shortens belt life; increases belt costs.

Cut down-time and V-belt replacement costs. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado

*—World's Largest Maker of V-Belts*

TPA 08

# Gates Vulco Rope Drives

## *Equipment & Supplies*

3-bladed propellers (driven by a ½-hp. motor) produce a uniform emulsion within 3 min. Moreover, unit also filters out all fine particles, eliminates use of batch cans, and ups mixing-room efficiency.

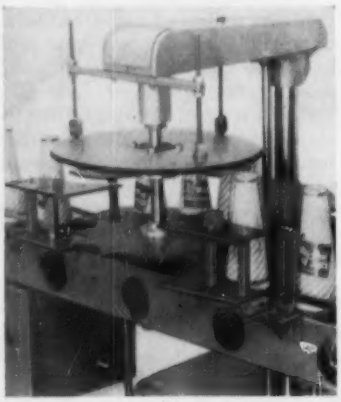
Water is delivered directly from a meter. Emulsified liquid is pumped to the sponge or dough mixer through a fine-mesh stainless pipe line filter. Normal operating capacity is 300-350 lb. of water (40-47 gal.), maximum capacity is 500 lb. (62 gal.)

Tank is of double-shell construction with vapor-barrier insulation between inner and outer shells. Inner shell, cooling jacket (optional), insulation, and external shell are welded to form an integral watertight unit. Both shells, propeller shaft, pump, filter, and fittings are of stainless steel.

Unit requires a vertical clearance of 59 in. Propeller motor is mounted at top of tank, while pump and its direct-connected ¾-hp. motor are floor-mounted at the side. Filter may be located at any convenient point in the pipeline between pump and mixer.

A timing panel for control of mixing and discharge cycles is optionally available.—*Read Standard Corp., Bakery-Chemical Div., York, Pa.*

Circle 121C on Reader Service Card



### Waxed Carton Bottoms Coded at 600/Min.

Bottoms of waxed, tapered paper containers may now automatically be coded on conveyor lines with use of this new imprinting attachment.

Compact unit is designed for var-

# Three food plant lube problems STANOIL Industrial Oil can help you whip

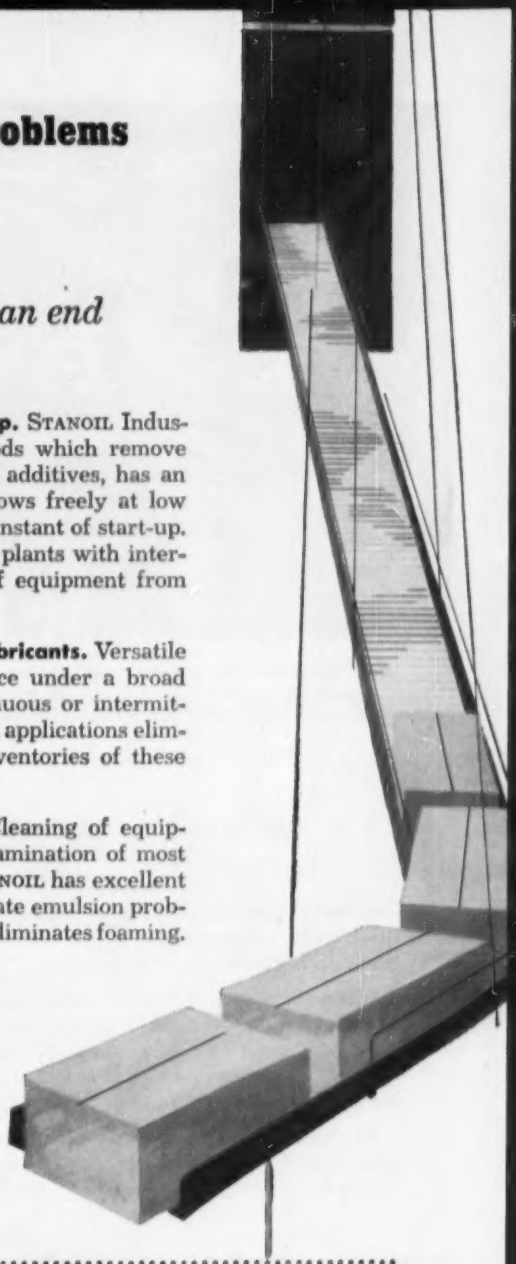
*big maintenance headaches can end with switch to STANOIL*

**1. Poor flow of lubricant on cold start-up.** STANOIL Industrial Oil, due to selective refining methods which remove waxy constituents and the use of special additives, has an exceptionally low pour point. STANOIL flows freely at low temperatures, is ready to lubricate at the instant of start-up. Candy, bakery and other food processing plants with intermittent production get full lubrication of equipment from start to stop.

**2. Large inventory of special purpose lubricants.** Versatile STANOIL gives top lubrication performance under a broad range of conditions...heat or cold, continuous or intermittent, high pressures and low. One oil for all applications eliminates special purpose oils, eliminates inventories of these oils, eliminates application mistakes.

**3. Water contamination of lubricant.** Cleaning of equipment and condensation mean water contamination of most oils with resulting water-oil emulsion. STANOIL has excellent demulsibility, is specially refined to eliminate emulsion problems, contains an additive which virtually eliminates foaming.

Check with your Standard Oil industrial lubrication specialist about converting your plant to STANOIL. There is one of these Standard men near you in any of the 15 Midwest and Rocky Mountain states. Call him or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

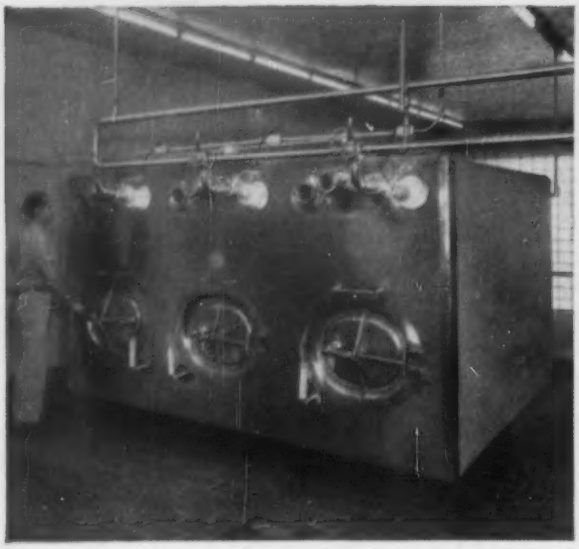


## Quick Facts About STANOIL Industrial Oil

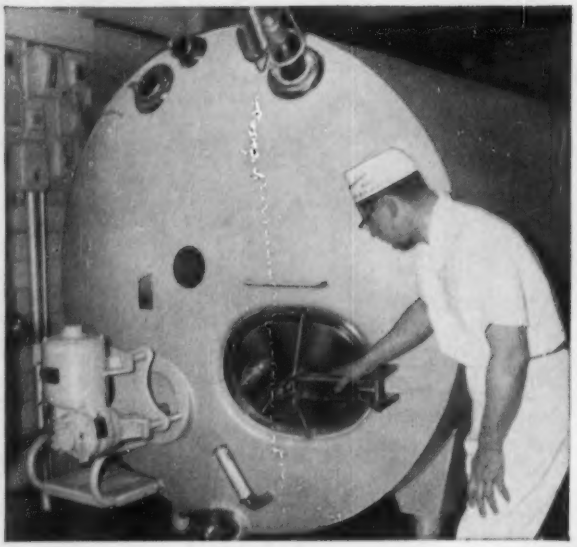
- **Stability.** STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention.** Inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts.** STANOIL has low pour point. Flows freely from cold start. No need for costly warm ups.
- **Resists Effects of Temperature Change.** STANOIL has high viscosity index, is resistant to change in both high and low temperature service.
- **Excellent Demulsibility.** STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.

**STANDARD OIL COMPANY**
(Indiana)

STANDARD



***Cherry-Burrell 3-compartment Rectangular Tanks*** ... Insulated for holding, heating, cooling. Standard capacities individual tanks to 5,000 gal. Special sizes upon request.



***Cherry-Burrell Horizontal Tanks.*** Insulated for holding or with channel wall surface for pre-heating, pre-cooling. Standard capacities to 10,000 gal. Larger sizes available.

# It's what's going on inside that counts

***And what goes on inside*** Cherry-Burrell Stainless Steel Tanks varies as much as the size and shape of the tanks shown here.

For example, you can use them as process vessels for handling a wide variety of liquids and semi-liquids ... to provide "surge" for heating and cooling in continuous systems ... for blending and pre-heating ... formulating and holding ... for mixing, heating and cooling.

No matter what size or shape tank you need ... or *what service you want it for* ... you can get it from Cherry-Burrell. And you can get more specific information from your Cherry-Burrell Representative. Why not lay your tank problems in *his* lap?

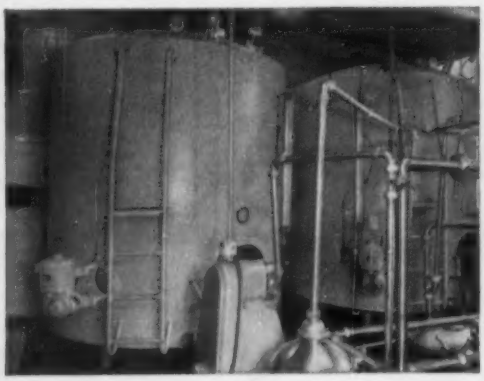
**CHERRY-BURRELL**
CORPORATION

427 W. Randolph Street, Chicago 6, Ill.

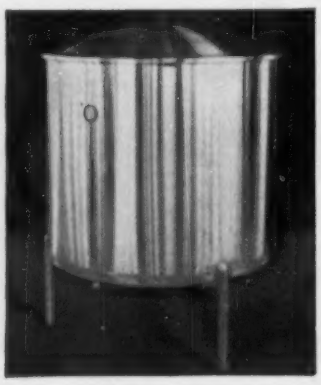
*Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies*

SALES AND SERVICE IN 58 CITIES — U.S. AND CANADA

***Cherry-Burrell Single-Shell*** tanks for holding, mixing, blending of one or more products. With or without agitation. Capacities to 3,500 gal. Larger sizes available.



***Cherry-Burrell Vertical Tanks*** for pre-heating, pre-cooling, holding product temperatures. Standard capacities to 3,000 gal. Larger sizes available.

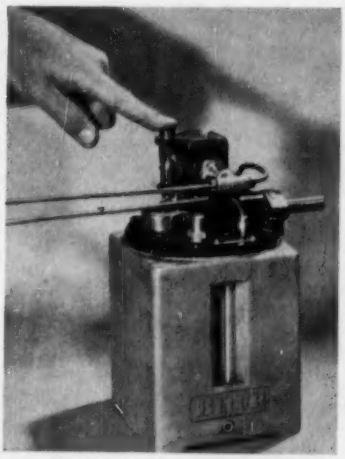


***Cherry-Burrell Open Top*** Single Shell Tanks for "surge" storage, batch mixing operations; side or bottom mixing. Standard capacities from 60 to 500 gal. Larger sizes available.

iable speeds up to 600 impressions per min., and for regular or intermittent product flow. It's portable and readily attaches to any conveyor line.

Coder employs rubber type and fast-drying ink to make sharp imprints even on heavily waxed surfaces. Code and date marks can rapidly be changed by substituting adhesive-backed pieces of type on an easily accessible type-wheel. Changeover from one size container to another is quickly accomplished.—*Adolph Gottscho, Inc., Hillside 5, N. J.*

Circle 122A on Reader Service Card



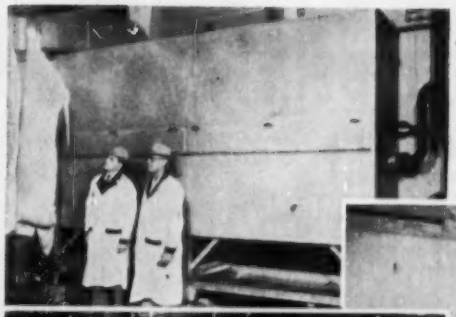
## Duplex Lubricator Offers Cyclic, Continuous Oiling

This automatic unit is specifically designed for machines having a dual lubrication problem—some bearings needing only periodic lubrication, others requiring oil continuously.

Known as AP-3, it employs two independent systems that provide both cyclic and continuous oil flow to different bearings on the same machine. Lubricator consists of two independent gear pumps with a common drive gear. They are mounted in a single housing, and draw oil from a common bottom reservoir and up through a felt filter disk.

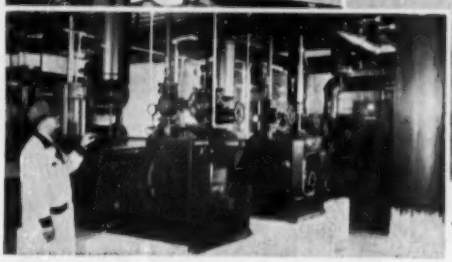
The cyclic branch is controlled by a cam-operated valve that bypasses the oil inside the pump and closes at predetermined intervals. This closing action directs oil into the cyclic distribution system. Since the cam is adjustable, both frequency and duration of the cycle can be varied.

Cyclic pressures range from 25-150



Vilter floor-mounted, flooded, fin coiled, two-speed air unit cools the beef chill room.

The freezer door opens into an anteroom which prevents loss of cold air while the palletized meat is being moved into the room for freezing.



Two Vilter 4-cylinder VMC's and one Vilter 2-cylinder VMC booster compressor in the Juengling plant.


**Q.** How can a packer obtain more rapid cooling with proper humidity?

**A.** with Vilter REFRIGERATION EQUIPMENT

It provides dependable, modern, automatically controlled cooling and freezing...

and costs less to own*

Helping to supply America with more and better quality meat is the new, modern Gus Juengling & Son plant addition in Cincinnati, Ohio. Refrigeration for this new plant addition is furnished by two Vilter 4-cylinder VMC compressors, one Vilter 2-cylinder VMC booster compressor and a vertical unit.

The new beef chill room is cooled by a large Vilter flooded finned coiled two-speed air unit. Due to its proper design, at no time is defrosting necessary. Humidity is kept at the right level . . . even air distribution is obtained . . . shrinkage has been kept at a very low figure.

The low temperature room, in which is located a blast freezing tunnel and storage space for over 100,000 lbs. of frozen product, is served by a Vilter water defrost finned coil unit.

For proper cooling and fully automatic refrigeration for your meat packing plants, food processing plants and cold storage warehouses, specify Vilter. With Vilter you can have full confidence of Quality equipment—trouble-free . . . dependable . . . efficient performance. Vilter provides bigger profits through better cooling.

Sold and installed by Vilter distributor, C. P. Wood and Company, Cincinnati, Ohio.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter®

QUALITY CRAFTSMANSHIP that lasts...

ENGINEERING DESIGN that guarantees performance

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Bandaloi Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

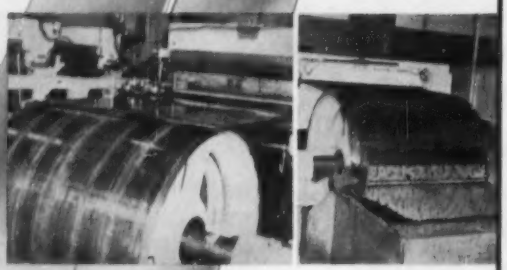



For more data, circle this page number on card at back →

# A CONVEYOR BELT OF SOLID STEEL

*is behind these Sandvik service records*

**Over 150 million cans** of Hershey's chocolate syrup have been carried by this Sandvik steel belt conveyor.



**More than 8 years of round-the-clock unattended operation** is the performance to date of this Sandvik steel belt conveyor being used in producing Nestle's® Semi-Sweet Chocolate Morsels at Fulton, N. Y.

Sandvik belts used for similar applications in other companies have been operating successfully for over 15 years.

Here are two samples of the kind of long-lived, trouble-free conveying you can get from a Sandvik steel belt conveyor.

In addition to inherent stamina, the stainless or carbon steel belt gives you a smooth, flat, tasteless and easy-to-keep-sterile surface.

Sandvik builds complete conveyors for a wide variety of food-handling applications. Belts can be of any length or width.

Write, wire or phone for further information.

**SANDVIK STEEL BELT CONVEYORS**

*Division of Sandvik Steel, Inc.*
1702 Nevins Road, Fair Lawn, New Jersey
Tel. Fair Lawn 4-6200 • New York City: ALgonquin 5-2200
Branch Offices: 230 N. Michigan Ave. • Chicago 1, Ill., FRanklin 2-5838
3600 E. Olympic Blvd., Los Angeles 23, Cal., ANgelus 5-6761
IN CANADA: SANDVIK CANADIAN LTD., 5675 Royalmount Ave. Montreal 16, P. Q.
*Manufacturers Of Steel Belt Conveyors For Over 40 Years*

SANDVIK STEEL BELT CONVEYORS

55-106


## *Equipment & Supplies*

psi., depending on the requirements of the machine. Pressure periods, or cycles, vary from every 5 min. to every ½ hr.

The continuous branch is fed by a constant-volume pump. Operating pressures range from 7-50 psi., depending on oil-volume requirements.

A manually operated feed button is included to send oil to the cyclic branch when starting a cold machine. Also available is a pneumatic timing device that holds the button down until a sufficient quantity of oil has gone through the system. A built-in hydraulic piston trips this timer, which automatically releases the button after 30-90 sec.—*Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N. J.*

Circle 125A on Reader Service Card

# CHEMICALS

### Anti-Corrosion Greases Cut Maintenance Costs

A new line of acid and alkali-resistant greases affords protection against numerous corrosive agents and solvents.

Known as 5 P, they prevent leakage, preserve packings, protect equipment and floors, and lower operating and maintenance costs. Three types, covering an operating range of 0-350 F., have non-fibrous bodies, pale amber to light green colors, 4 consistencies, and an ASTM penetration range of 200-350.

Applications include lubrication of plain and anti-friction bearings, driving chains, pump-packing glands, and lubricated plug valves in equipment such as can closers, extractors, pumps, conveyors, and in-take water screens.

Products come in a variety of containers ranging from 1-lb. cans to 400-lb. drums.—*Keystone Lubricating Co., 3100 N. 24th St., Philadelphia 32.*

Circle 126A on Reader Service Card

### Water Conditioner Ups Washing Efficiency

General plant sanitation and special washing may be improved with use of this highly soluble water conditioner, a combination of chelating agents, water softeners, and wetting agents. It is termed effective in

## At the new **CARLING** 600,000 barrel eastern plant

*General Contractor:*
GILBANE BUILDING CO., PROVIDENCE, R. I.

*Mechanical Contractor:*
HARTWELL COMPANY, INC., EAST PROVIDENCE, R. I.

*Heating Contractor:* J. C. HIGGINS CO., BOSTON, MASS.

*Plumbing Contractor:*
JAS. B. CASSEDY, INC., CAMBRIDGE, MASS.

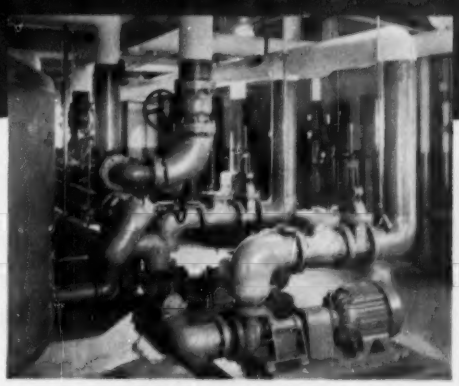
# JENKINS VALVES

### control piping planned for new standards of brewing efficiency

At Natick, Massachusetts the new plant of the Carling Brewing Company gleams like a giant laboratory, totally different in every aspect from the conventional brewery architecture of the past.

In layout for operating efficiency, as well as appearance, the Carling plant sets new standards. All equipment was selected to meet the critical requirements of this advanced design. Over 2000 Jenkins Valves were installed on the basis of proved dependability, safety, and long-range maintenance economy.

This *extra value* built into Jenkins Valves is recognized by plant operating managements in every type of industry. Let the Jenkins Diamond be your guide to lasting valve economy. Jenkins Bros., 100 Park Ave., New York 17.



**JENKINS VALVES** selected to control steam, water, waste, and processing pipelines include many sizes and patterns of bronze, iron, cast steel, and stainless steel valves. Illustration shows large iron gate and check valves in the filtered water pump system.

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
SINCE 1864 TRADE JENKINS MARK
Jenkins Bros.

SOLD THROUGH PLUMBING-HEATING AND INDUSTRIAL DISTRIBUTORS

Season's Greetings!
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Asst. Sales Mgr.
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Asst. Tech. Dir.
L. R. Patton, Jr.
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Kansas City
Warren Keller
Mgr., Flour Service Div.
Kansas City
Jack A. Revord
Chicago
C. L. Chapin
Kansas City
D. L. Nunn
Kansas City
W. Quincy Isaacs
Kansas City
To all our friends, our sincere wishes for a very Merry Christmas and a Happy and Prosperous New Year.
R. S. Whiteside
President
Sterwin Chemicals
IN CANADA:

neutral, medium, and high pH solutions.

Designated #101, product chelates iron, calcium, and other hard-water elements to increase wetting ability of detergents and alkali. Typical applications include preventing of hard-water deposits, removing rust from bottle necks and cans, and cleaning of vacuum pans.

For water of medium hardness (8 gr.), about 5% of this material is added to 95% caustic. A dust-free granular product, it is available in 100 lb. kegs.—*E. F. Drew & Co., Dairy Special Products Div., Boonton, N. J.*

Circle 126B on Reader Service Card

# INGREDIENTS

## New Thickener Eliminates Cooking of Pie Fillings

Cooking may now be omitted in the processing of fruit-pie fillings through use of a new instant starch thickener. Thus, problem of cooling cooked fillings, or refrigerating them in hot weather, is also eliminated.

Known as Purity Stabilizer #37, product is added to water and agitated at high speed for a few minutes. Then fruit, fruit juice, and sweetness are incorporated. There is no bruising or damage of fruit, which retains its original color and appearance.—*National Starch Products, Inc., 270 Madison Ave., New York City.*

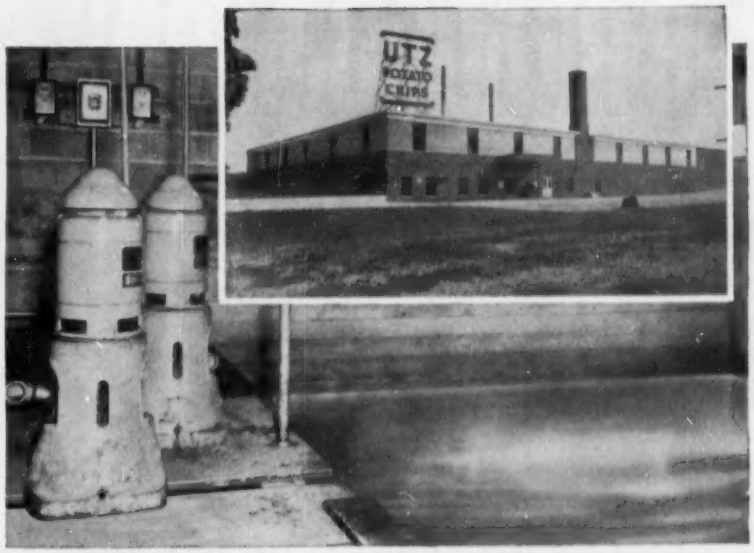
Circle 129A on Reader Service

## Coffee Flavoring Packed In Collapsible Tubes

Greater storage stability and ease of dispensing are advantages cited for a new coffee concentrate to be made in jelly or paste form and packaged in collapsible tubes.

Flavoring is simply squeezed out of the tube into a measure. Since no air replaces the used portion, deterioration is minimized as the tube is recapped. It is planned to package the concentrate in 8 oz., 1 lb., and 5 lb. tubes.—*Sol Cafe Mfg. Corp., 180-05 Brinckerhoff Ave., Jamaica 12, N. Y.*

Circle 129B on Reader Service Card


**Deming Turbine Pumps Perform Dual Service**

***Separately or Together***

Pure spring water is used in processing those tasty chips produced by the Utz Potato Chip Company, Hanover, Pa. Purity of the water supply is evidenced by its acceptance by the Pennsylvania State Health Department. The same cool spring water is used for air conditioning units in the modern plant.

Purity of the water is protected with two Deming Vertical Turbine Pumps. Those water-lubricated units assure that the water supply will not be contaminated by oil or grease as none is used.

The two pumps can be operated as one unit, or separately, as required, for processing and air conditioning service. This is another example of the adaptability of Deming Vertical Turbine Pumps for a wide variety of applications.

(PLEASE PRINT)

**THE DEMING CO., 556 Broadway, Salem, Ohio**

Please send free copy of your Turbine Pump Bulletin No. 4700-51.

*My name* _____

*Company* _____

*Street* _____

*City* _____ *Zone* ____ *State* _____

☐ Please check here if you want the names and addresses of Deming Distributors in your area.

# PROTECTION

*all along the line*

*High heat and corrosion resistance. Exceptional strength and wear resistance. Straightness and concentricity with uniform wall thickness.*

**WALLINGFORD**
*Stainless Steel*
**COLD DRAWN TUBING**

*In the sports field, the football quarterback is protected from the hard-charging enemy by his stalwart forward line. In the products field, the purity and flavor of food products is best protected by Wallingford Stainless Steel Cold Drawn Tubing in flow lines, coolers, pasteurizers, sterilizers, heat exchangers, evaporators, bottling machines and other food handling equipment.*

*Wallingford Stainless Steel Cold Drawn Tubing is furnished in analysis Types 304 – 304L – 316 – 316L with accepted sanitary polishing inside, outside, or both . . . or regular annealed and pickled.*

*Long-run economy is assured by low cleaning and maintenance costs, long life and uninterrupted service, and the elimination of product spoilage.*

*Write for free booklet,*
**"WALLINGFORD Quality Tubing and Pipe."**

THE **WALLINGFORD** STEEL CO
**WALLINGFORD, CONN., U.S.A.**

*COLD ROLLED STRIP*
*Super Metals • Stainless*
*Alloy • High Carbon • Low Carbon*

*WELDED TUBES and PIPE*
*Super Metals • Stainless*


## BRIEFS . . .

**Centrifugal Liquefier** melts 2,000 lbs. butter per hr., is also used for frozen cream or eggs. Steam heat is transferred through revolving 55-in. disk.—*Bryant Machinery Corp., 67 Van Reipen Ave., Jersey City 6, N. J.* (130A)

**Vacuum-Dryer Line,** employing rotating cone-shaped chamber, offers capacities of 1-325 cu. ft. Available in stainless, aluminum, Monel, bronze.—*Paul O. Abbe, Inc., Center Ave., Little Falls, N. J.* (130B)

**Dual Cargo Light** has rubber-mounted sockets, adjustable steel reflector guards, 35 ft. cord.—*Hoffman Engineering Corp., Anoka, Minn.* (130C)

**Disk Filter** with 12 segments per 9-ft-dia. disk employs special gravity drainage before discharge for drier cake.—*Denver Equipment Co., P. O. Box 5268, Denver 17, Colo.* (130D)

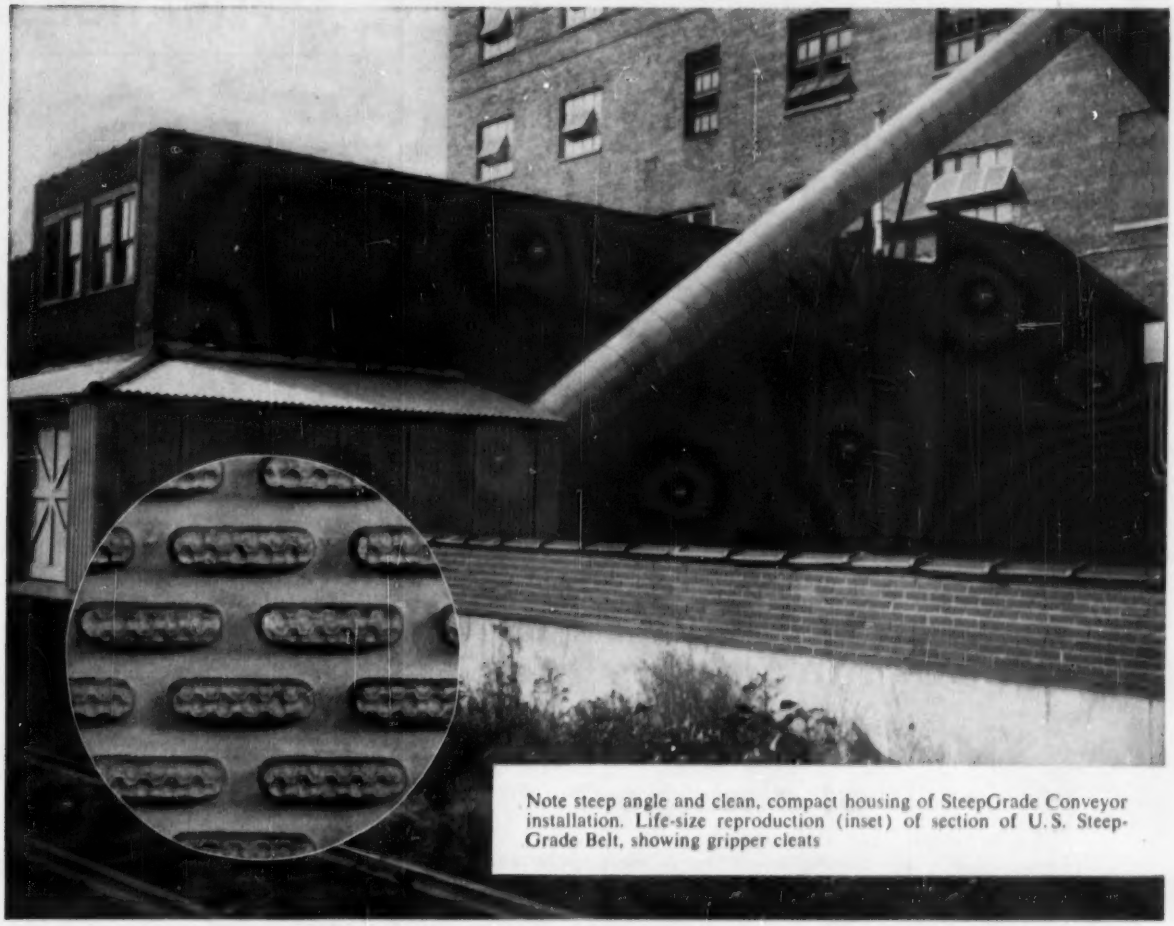
**PVC Eductors,** for use in liquid pumping, solids handling, and mixing, offer high resistance to corrosion. Six sizes range from ¼-3 in. Maximum pressure and temperature; 125 psi., 160F.—*Schutte & Koerting Co., Cornwells Heights, Bucks Co., Pa.* (130E)

**New Thermocouple Connectors,** consisting of plastic plugs and jacks, have disk markings for easy identification of insert alloy and different sized plug prongs.—*Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44.* (130F)

**Centralized Lube System,** for machine parts, employs one or more manifold blocks threaded for insertion of standard hydraulic grease fittings. Technique cuts lubrication costs, prevents "overlooking" of contact points, and permits operation without machine shutdown.—*Lincoln Engineering Co., 5781 Natural Bridge Ave., St. Louis 20.* (130G)

**'57 Truck Line,** ranging from pickups and sedan deliveries to giant tandems, offers new V-8 engines coupled with advances in safety, durability, and performance. Two forward control models provide greater hauling capacities for bottled beverages and dairy products.—*Chevrolet Motor Div., General Motors Corp., Detroit 2, Mich.* (130H)

## NOT A SLIDE THAT SLIPS...BUT A BELT THAT GRIPS



Note steep angle and clean, compact housing of SteepGrade Conveyor installation. Life-size reproduction (inset) of section of U.S. SteepGrade Belt, showing gripper cleats

# U. S. STEEPGRADE conveyor belt with exclusive gripper-cleat construction

When officials of a large Mid-Western packing plant decided to build a plant for the production of dry dog food, they ran into a problem:

Their engineers had decided that the raw materials (in bags weighing 100 lbs. each) could best be processed at the top floor of the plant. But this required a conveyor belt from the railroad siding to the top floor that would carry the materials at an angle of 35 degrees. Any lesser angle would have meant cutting the belt through the lower floors of the building—entailing expensive construction charges.

United States Rubber Company engineers came through with the answer. On their recommendation, a U.S. SteepGrade Belt was installed. Its unique *gripper-cleat* design easily gripped heavy bags and provided positive ascent.

With U.S. SteepGrade there are no "avalanches" at critical angles, even up to 45 degrees with some materials! Its ability to work at steep inclines saves valuable floor space, conveyor length and belt footage. Special molding process makes belt and cleats one unit; this *exclusive* feature prevents gripper cleats from being torn off by heavy cases. Surface design incorporates self-cleaning action as belt flexes over pulleys—cleans as it flexes.

Get in touch with any of the 27 "U.S." District Sales Offices or write Rockefeller Center, New York 20, N. Y.

US RUBBER

Mechanical Goods Division

**United States Rubber**



For more data, circle this page number on card at back →

"CHANGE IN PRODUCT"..."CHANGE IN MATERIAL"..."CHANGE IN PRO
TOOLING"..."CHANGE IN SPEED"..."CHANGE IN "CHA
IN FEED S"...
"CHANG IDITY
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MPERAT IN SP
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LUME". ROCESS
IN TEMPERATURE"..."CHANGE IN TOOLING"..."CH IN SPEED"..
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# Can your machinery meet the challenge of change?

STERLING SPEED-TROL VARIABLE SPEED MOTORS

STERLING SLO-SPEED GEAR MOTORS

STERLING CONSTANT NORMAL SPEED MOTORS

STERLING MULTI-MOUNT SPEED REDUCERS

**Sterling Speed-Trol Variable Speed Motors** provide you with one of industry's greatest production advantages—versatility of machinery and equipment. Only by adapting speed of machinery to changes in product, material, volume or to any other factor influencing productivity and product quality can you have this important competitive advantage—operating machinery at optimum efficiency under changing production conditions. Investigate the benefits Speed-Trol Variable Speed Motors can bring to your plant. They have your production future built into them.

**WRITE TODAY FOR STERLING SPEED-TROL VARIABLE SPEED MOTOR BULLETIN NO. 188**

Sterling offers you a wide range of Electric Power Drives of advanced design—variable speed or constant speed—with manual or automatic controls.

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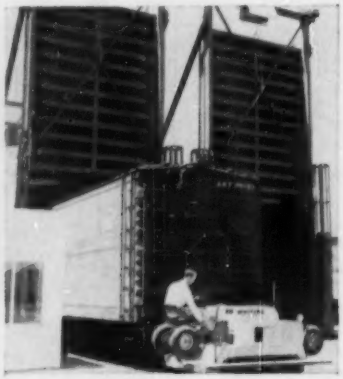
STERLING ELECTRIC MOTORS

Los Angeles 22 • Chicago 38 • Cincinnati 37 • New York 51

# EQUIPMENT APPLICATIONS



## Tractor Speeds Shipping Of Vac-Cooled Lettuce

Two rail-riding tractors enable Union Ice Co. to move six carloads of lettuce per hr. through its twin vacuum coolers at Salinas, Calif.

Loaded cars are brought to the chambers by these units (Trackmobiles, Whiting Corp., 157th St. & Lathrop Ave., Harvey, Ill.), which employ jacking couplers to push or pull them inside.

Tractor's special design permits it to shuttle between the two loading tracks on its load wheels (shown raised in photo). Then it converts to its rail wheels to move another refrigerator car in or out of the chamber. This eliminates delays caused by waiting for a railroad switcher to spot cars, and saves switching charges as well.

Circle 132A on Reader Service Card

## 2-Compartment Trailers Safeguard Perishables

Efficient refrigerator transport guards the quality of perishables delivered to 21 supermarkets of the Marsh Foodliners chain in Indiana.

Employed for dairy products are 2-compartment truck-trailers (Fruehauf Trailer Co., 10967 Harper Ave., Detroit). Frozen foods and ice cream are carried in the front third of the unit, with milk, cheese, butter, cottage cheese, and poultry in the rear two-thirds. Other vans haul meat directly from the packing plant, holding them at ideal temperature.

Trailers have sliding tandem units that permit legal loading in any state. Rear axle can be moved to any position to conform with "bridge formula" or state loading laws.

Circle 132B on Reader Service Card

## Tomorrow's Plant Today

—*Continued from page 61*

power lines serving the plant. Power is delivered at 33kv. and stepped down to 4160v. in an outside sub-station. From here it is delivered by two separate lines to 8 sub-stations within the building.

Half of the plant is served by four sub-stations, and the other half by the remainder. This insures that no more than half of the equipment will be shut down by an inside failure.

Machines in the plant are driven by 440v. motors. Voltage is reduced to 120-208v. for the 4-wire lighting system. In addition, an emergency lighting system is served by separate wiring.

Lighting is at a level of 40-50 candles. Lights are Rapid Start fluorescents with white reflectors that direct enough light upward to reduce brightness and give a pleasing effect.

*End* (*Resume reading on page 62*)

## Ups Distribution Efficiency

—*Continued from page 93*

be air- or steam-cleaned for the next load.

Presented at the seminar by Origin-to-Destination Container Corp. was its bulk handling Sealdbin Container Car. This special-service lease car carries seven Sealdbins of 300 cu. ft. (20,000 lb.) capacity each. It has been submitted to Association of American Railroads for classification LG. Under this classification, the gondola type car would earn an allowance of 3.2¢ per mile both ways.

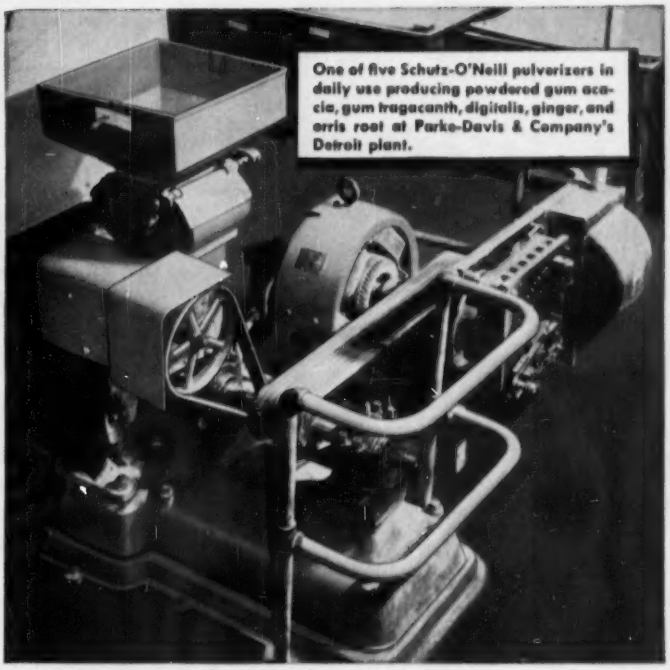
Another new development exhibited was an inflatable rubber dunnage, called Shor-Kwik (United States Rubber Co., Providence, R. I.). This is blown up to take up slack space and cushion carload shipments against damage.

A new thin-gage aluminum pallet was demonstrated by Aluminum Co. of America, along with a hydraulically actuated Yale & Towne fork-lift truck push-pull type retriever. The captive pallet is automatically recovered when loading cars or trucks.

Also demonstrated was an air-supported portable warehouse, containing more than 64,000 cu. ft. of storage space (see FE Nov., p. 196).

The U. S. Rubber "Airhouse" is suitable for food manufacturers in need of seasonal temporary storage for package goods during peak production months. It will be leased and sold through CID.

*End* (*Resume reading on page 95*)

One of five Schutz-O'Neill pulverizers in daily use producing powdered gum acacia, gum tragacanth, digitalis, ginger, and orris root at Parke-Davis & Company's Detroit plant.

**SCHUTZ-O'NEILL PULVERIZERS**

***A 50-YEAR TRADITION***

The name Parke-Davis & Company is known worldwide as a leading pharmaceutical manufacturer. For over fifty years Schutz-O'Neill pulverizers have played a dominant part in this well earned reputation in the production of highest quality products that meet the most rigid standards.

Manufacturers of food, chemical, drug and mineral products have depended on Schutz-O'Neill pulverizers for over 65 years. In all parts of the world Schutz-O'Neill pulverizers are in daily operation preparing materials ranging from microfine powdered sugar in the food industries, to borax in the mineral industries.

Versatility for production of medium-coarse, fine and microfine powders have made them the choice for milling superior powders from such materials as specialty grain fractions, cocoa powder, aspirin, saccharin, ultrafine diatomaceous earth, limestones and phosphates, urea melamine and phenolic plastic moulding powders, and herbs, barks, roots and seeds of all types.

**One of six new SCHUTZ-O'NEILL SUPERFINE PULVERIZERS**

**now available in sizes ranging from 7½ to 125 horsepower with grinding chambers 12" to 28" in diameter.**

***SEND SCHUTZ-O'NEILL YOUR SIZE REDUCTION PROBLEMS***

**Our engineers will welcome working with you on your new product or help improve the milling operation of your present products. Give us your requirements and send a sample of feed material for a pilot plant test. There is no obligation.**

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# LETTERS TO THE EDITOR

## Quick Frozen Food Engineer Proposes Coin-Machine Distribution

Dear Sir:

You make a statement that rings a bell with me in your editorial, "Packers Must Act on Frozen Food Problem" (FE, Sept., p. 100). You say that retail stores should sell frozen foods from completely enclosed dispensing cabinets from which packages could be mechanically selected and discharged.

The writer designed the cabinet used in Birds Eye's beginning at five retail locations in Springfield, Mass., and has served as a frozen food consultant and engineer for many years. And out of my experience, I anticipated your editorial suggestion and went you one better.

I already had designed a coin-operated frozen food vendor. For as I see it, there is a great opportunity to sell frozen items at locations other than stores.

The apartment trend in both city and surburban housing has brought new opportunities to food retailing.

Occupants of these new modern types of homes are the product of today's high-level, high-paid employment conditions. In many families both husband and wife work, so time for shopping is limited to the late afternoon when the jam is at its peak.

Also, the confined space in the kitchens of the modern efficiency apartments rules out the extra frozen food storage cabinets found in larger homes. And the passing of the corner grocery store has removed shopping convenience for apartment dwellers.

Scientific merchandisers agree that easy accessibility is fundamental to popularizing any commodity. Processors, distributors, and retailers of quick frozen foods are becoming more and more aware that there must be an additional system of distribution to bring their product to the masses in greatest volume. To them we say, that dynamic channel of retailing so successfully used for other packaged merchandise should be developed for them. We refer to the coin-operated dispenser.

The writer, who has spent five years in engineering research and design, now feels that he can suggest, as the starting point, the simple, practical machine sketchily illustrated and described herein.

The initial units would be 100 in.

long x 30 in. deep and 80 in. high. The cabinet has the general appearance of the cigarette vendor, but with one outstanding feature—each package shown is the one selected and taken out by the customer of the cabinet.

This "Auto-Teria" has means to illuminate the package for sale, and the money slots and return coin cups are within easy reach.

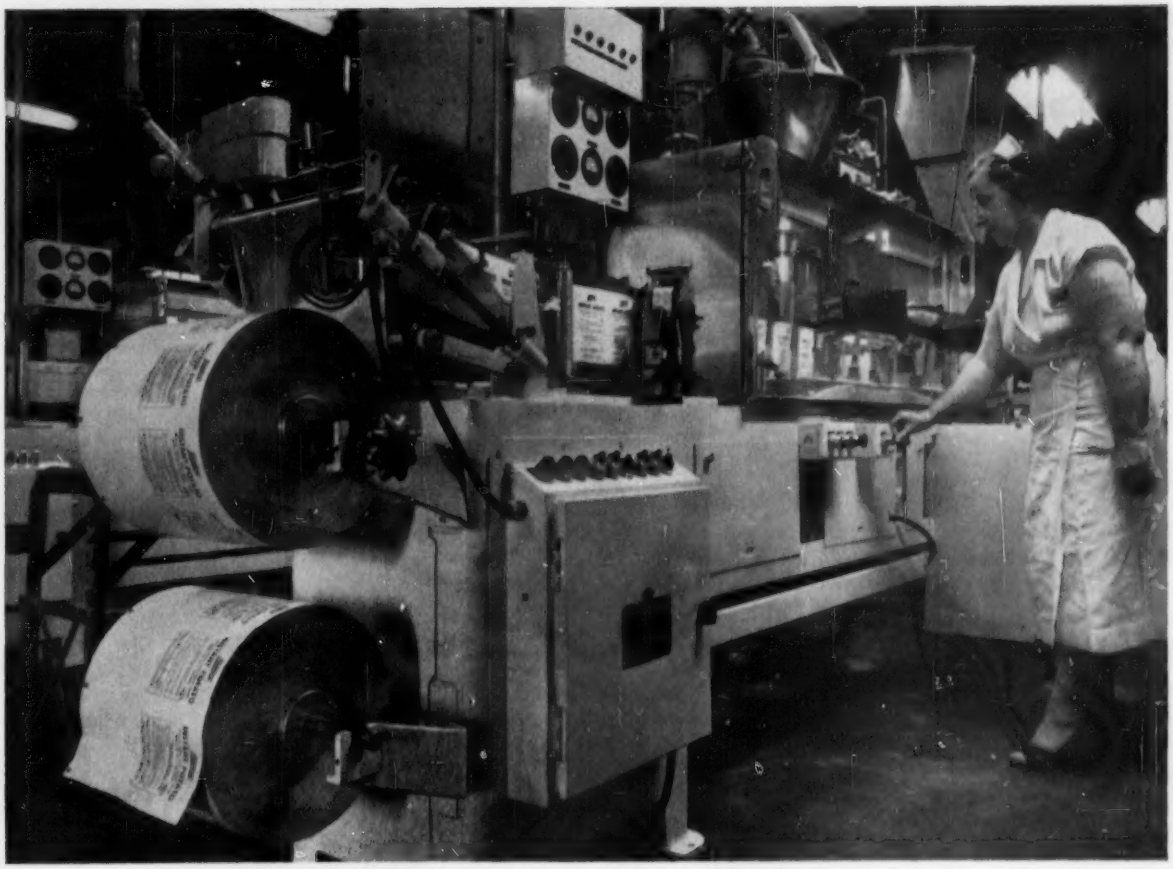
The packages are fed in bulk into the cabinet and a trigger, or dog, holds the package to be dispensed until the correct coin or slug is inserted into the slot, when the package is released and the motor propels the next package into the dispensing position.

Consider a few of the many new locations where the automatic dispenser would benefit the shoppers. The multi-storied apartment house, having hundreds of family units, would have available space in the long public corridor. A battery of four to ten of the units could be arranged along the wall.

In garden-type apartment areas, one or more of the units could be used for frozen food vending.

Other possible locations are gasoline service stations and bus and railroad terminals.

The coin dispenser offers a packer, or a group of packers, exclusive distribution outlets for their brands. A single service man, whose duty it would be to keep the magazines of the dispenser loaded, represents the only personnel required.—Reuben E. Ottenheimer, Baltimore, Md.



## *"Polyethylene-coated foil*

# enabled us to double shelf life"

In this package, polyethylene and foil provide water-vapor transmission resistance. Humidity cannot get at the product. The foil is a gas barrier to retain the nitrogen, and the polyethylene heat seals excellently, allowing assured closing of the package. **Reynolds Metals Co.**, Louisville, Ky., makes the packages.

"Instant Potato," according to the R. T. French Co., Rochester, N. Y., "is actual cooked potatoes, reduced to granular form . . . food which must be kept fresh. It was necessary to create a package that would retain its own inner atmosphere, despite handling in shipping and storage on shelves (either in the store or in homes). The package should be colorful, flexible, and small. It should be sealed completely.

"Our production has reached 20 million packages and the market is still expanding. Due credit must be given to the packaging."

Here is one more problem effectively solved by a package made with BAKELITE Brand Polyethylene. For other case histories that can give you ideas for your own problems, write Dept. TI-63. Or see your packaging supplier for his valuable advice.

***It pays to package in materials made with***

**BAKELITE**
BRAND
**Polyethylene Plastic**

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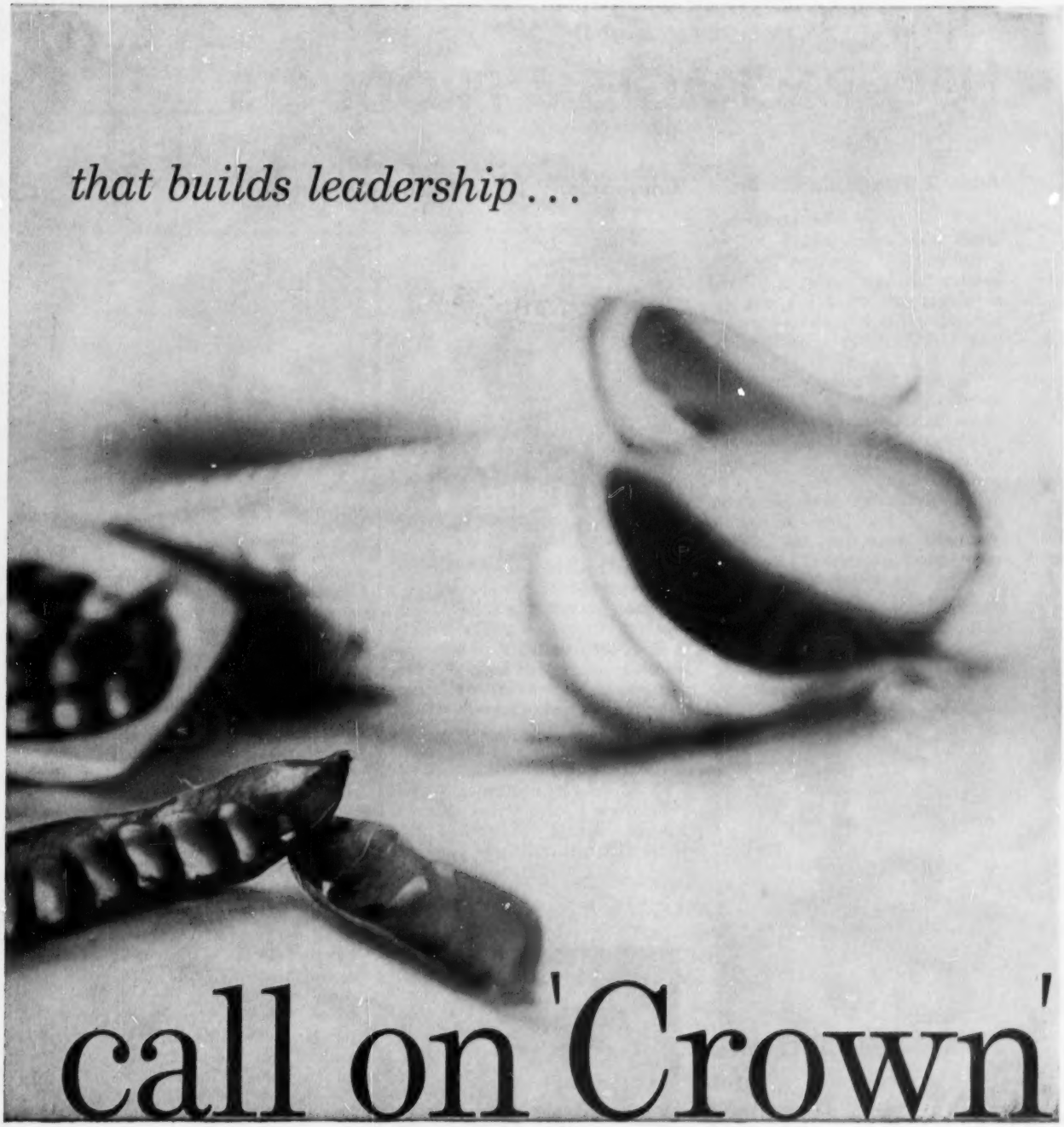
CROWN CORK & SEAL COMPANY, INC., BALTIMORE 3, MARYLAND




Packers of some of the nation's leading consumer products *call on Crown* for cans. Their products range from fresh peas to motor oil, from beer to paint, from citrus fruit to soup.

These companies seek packaging that will build and *hold* sales leadership. As one of the nation's leading producers of cans, Crown's ability to solve packaging problems is proven in many ways. Crown has the most modern metal lithography plant in the packaging field. It is an important source of cans for beer, milk, food, citrus products, cosmetics, petroleum and paint. It is the leading producer of bottle crowns and closures for glass containers . . . of filling and capping machinery for beer, milk and soft drinks. It also designs and builds contract machinery for a variety of uses.

We invite you to take advantage of Crown's broad knowledge and experience in packaging. For service and economy that will pay you real dividends . . . *call on Crown.*

# NEW PACKAGES & PRODUCTS

## Adds 2 Plastic Containers

A 1 gal. and a ½ pt. plastic container have been added to the Premium Plastics Inc. line. The ½ pt. size is available in either crystal clear or high-impact styrene. The 1 gal. size comes in high impact polystyrene with a flexible snap-on polyethylene lid.

Supplier stresses maximum strength and visibility through exclusive production techinques. Containers are designed for packaging ice cream, sherbets, salads, and other prepared foods.

Supplier had previously distributed 1 pt., 1 qt., and ½ gal. sizes. Both direct lid imprinting and labeling methods will continue as a service on the new sizes, as it does with others in the line.

Circle 138A on Reader Service Card

## Package Cheese in Tumblers

Tall, silver-flecked tumblers molded of Bakelite C-11 plastics provide an attractive new package for Sealtest cottage cheese. The reusable tumblers not only feature a high sales and impulse appeal package, but may be reused to serve beverages, with the lid used as a coaster.

The twelve-ounce tumblers may be washed in hot water and are reported to withstand rough handling without shattering. The plastic is also resistant to staining by alcohol, tea, coffee, and citrus juices.

Tumblers are available in red, green, blue and yellow.

Circle 138B on Reader Service Card

## 'Companions' Liven Biscuit Competition

Ballard's Oven-Ready, a refrigerated ready-to-bake biscuit now has a companion product in Ballard Oven-Ready Buttermilk Biscuits.

Processor reported that consumer research revealed a demand for a Buttermilk Oven-Ready to accompany the established sweetmilk-type product.

Packaging of the newcomer is similar to that of the present product, an 8 oz. cylinder containing 10 biscuits. New label is styled after the familiar Ballard barber-pole and features maroon stripes on yellow.

Pillsbury Mills has introduced Pillsbury Sweetmilk Biscuits as a companion item to their buttermilk biscuits. The refrigerator bake-and-serve biscuits are made from a new formula, and offer the consumer variety in flavor, texture, and volume.

Packaging is similar to that of the buttermilk biscuits. Bright yellow is used for instant identification of the Sweetmilk, blue for butter-milk.

Development of the new product was spurred by consumer research among Pillsbury users, which indicated a demand for variety.

## Turkeys Go National

National distribution of Swift's Premium Butterball pre-stuffed turkeys has begun. Ranging in size from 5-15 lb. without giblets, the birds are vacuum-packed in a bright Cry-O-Vac wrapper.

Legs are tucked to present the famous Butterball appearance. Two types of stuffing are available: old-fashioned white-bread stuffing, and corn bread stuffing.

Giblets are used to produce the new canned giblet gravy. This shelf-stable product may be displayed on the regular groceries shelf or with the poultry in the frozen-food case. It is packaged in 1 lb. brightly colored cans.

**Marketed nationally** by Armour & Co. this month are 5-10 lb. frozen turkeys, ready for roasting without defrosting. Convenience to the housewife is reported as the idea behind the new product.

The birds are stuffed and trussed, eliminating the need for any preparation on the consumer level. They

# touched with chocolate stars . . .

WESTON BISCUIT COMPANY'S CHOCOLATE CHIP COOKIES ARE KEPT FRESH AND APPETIZING BY AN INNER LINER OF RIEGEL'S WAXED AMBER GLASSINE

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Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

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ROASTED and PEELED

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in No. 2½ and convenient No. 10 tins

ALL CLEAN * ALL USABLE NO WASTE

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*ask your distributor, or write*

GENTRY

Los Angeles 54, California


carry both the Armour Star and Pepperidge Farm labels (stuffing is supplied by Pepperidge).

## Flexible Film Winner

A Saran casing used by a Dutch liverwurst packing company was awarded first place in the 1956 National Flexible Packaging Competition, held in October at Lake Placid, New York.

Scoring over all other casings in the film, bags and pouches classification, the casing was designed and manufactured by Tee-Pak Inc., Chicago for Hartog Fabrieken of Oss, Holland, a Lever Bros. subsidiary.

Package was manufactured under Tee-Pak's patented Unilox printing method (ink between two layers of Saran). Casing is printed in four colors: white, green, red, and metallic gold.

Circle 140A on Reader Service Card

## Zip-Open Oleo Pack

A Zip Tape has been added to Kraft Food Company's Parkay Margarine package. The red tear-open strip is made of 900-gage laminated cellophane manufactured by Dobeckmun Co., Cleveland.

Zip-Tape (registered trade mark of Dobeckmun) is now put up in 3 lb. spools, specially designed to reduce down time when rolls have to be changed.

Kraft recently tested the tape and found the results so acceptable that Kraft has redesigned their entire packaging equipment to take advantage of the more economical production that the new 3 lb. spool reportedly offers.

Also, Dobeckmun has increased core size of the Zip-Tape spool to reduce possible curling of material, and allow greater friction contact between the core and flange for rigidity and support during shipment.

Widths of the new spool remain the same as the previous 2 lb. size, permitting use of all standard spindle lengths.

Circle 140B on Reader Service Card

## Antique Jar for Jellies

A wide-mouthed antique design jar with a fitted glass cover is the new package for the Fozz line of preserves and jellies.

The 8 oz. reusable jar has blown-in

## *She packs 40,000 cigarettes a minute*

Only precision made corrugated shippers can accommodate 50 cartons of Viceroy Cigarettes at a single thrust of the case loader. Boxes by Hinde & Dauch are the answer.

**HINDE & DAUCH**

Subsidiary of West Virginia Pulp and Paper Company

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14 FACTORIES • 42 SALES OFFICES



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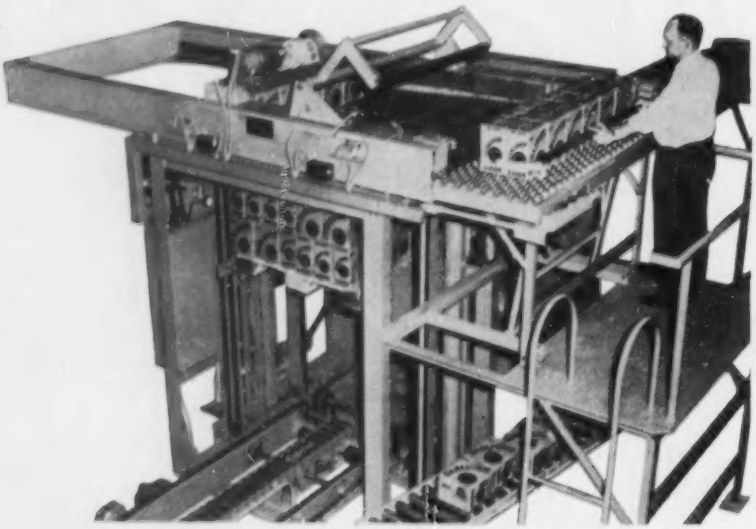
*What's in a name?*

# MATHEWS



New Mathews Semi-Automatic Pallet Loader developed for the food and beverage industries.

## *This one is on some of the outstanding conveying systems in the Food Industry*

Mathews' Engineers have been designing and building gravity and power conveyers and special conveying machinery for over fifty years, and a great amount of this equipment has been applied in food plants. Mathews' Engineers know case and carton handling problems. That's why so many people in this industry have an extra measure of confidence in Mathews equipment—and why you see Mathews Conveyers in modern food plants everywhere.

50 YEARS OF MCC MECHANIZED HANDLING

**MATHEWS CONVEYER COMPANY**

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SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . MATHEWS CONVEYER COMPANY, LTD.
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities.
Export Representative—Foreign Trade Division of New York Hanseatic Corp.


diamond-shape design which simulates early hand-made glassware. The glass cover is packed inside the jar and can be easily removed on opening the package. The jar has a reuse value as a server for preserves, jellies, mustard, etc.

The processor, Chester C. Fosgate Co., Orlando, Fla., is using the package for pineapple and boysenberry preserves, blackberry and strawberry jellies.

Jars and fitted covers are both manufactured by Owens-Illinois Glass Co.

Circle 140C on Reader Service Card

### Freezes Sandwich Trio

Fradelis Frozen Food Corporation has added three frozen sandwiches to their frozen dinner line: frankfurters, pastrami-dipped, and corned beef.

Two sandwiches are packed in each carton. The consumer need only heat and serve. The frankfurters on buns are complete with chili meat sauce and American cheese. The pastrami-dipped sandwiches are made on french rolls. Corned beef sandwiches are on rye bread.

**TWIST-OFF CAP** for catsup bottles is newest White Cap Co. product. A quarter turn removes or replaces the closure. Lug design and high-gloss finish are features. Cap retains manufacturer's Vapor-Vacuum sealing advantages.

Circle 142A on Reader Service Card

### Bavarian-Style Brew

Colorful Alpine mountains provide the backdrop for Anheuser-Busch, Inc.'s new Bavarian beer label.

Directed at boosting sales appeal, revised design is lithographed on a 12-oz can. The beer is reported to be receiving wide acceptance in the Busch Bavarian market areas, Kansas, Missouri, Illinois.

### Canned Potato Salad

Mayonnaise style potato salad is being offered in a 1-lb can by Streator-Read Foods, Inc., Streator, Ill.

Made with potatoes, mayonnaise, onions, vinegar, pimentos, green peppers, cereal starch, spice, algin derivatives and paprika, the product is vacuum packed and need not be refrigerated. Processor has previously introduced a German style potato salad.

### Borden Adds 5 New Items

Recently placed on the national market by the Borden Co. are two new malted products and three new gelatin solids.

The two malted food products are "Borden's Instant Double Malted Chocolate Malted Milk" and "Borden's Instant Hemo," both the result of more than three years of research and development. Reported to be instantly soluble in hot or cold milk, the drinks are easy to prepare.

Malted milk powder has been a Borden product for the past 50 years, but the new chocolate malted milk product is said by the processor to

MORE AND MORE OF THE NATION'S LEADING FOOD PROCESSORS ARE BRINGING THEIR PROCESSING, EQUIPMENT AND PRODUCTION LINE PROBLEMS TO

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Our 100 years of background knowledge and engineering experience in helping perfect processing methods, designing special equipment or furnishing "standard" equipment, recommending plant set-up . . . assures the kind of assistance that is available to processors faced with product quality and production cost problems.

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Manufacturers of Food Processing Machinery since 1855

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# Lustrex makes a sweetheart of a candy package!

*Transparent red plastic container is gift wrapping that promotes impulse sales*

Breathes there a beau who could walk past this brilliant red heart without a second look? It's a natural when it comes to selling gift candy.

Molded in sharp, clean detail of Monsanto Lustrex styrene, this plastic box is tough and break-resistant. And Lustrex—odorless, tasteless, non-toxic—won't affect the purity of the contents.

In the skilled hands of packaging specialists, Lustrex is being shaped into a wide variety of sales packages—high fashion for luxuries, low-cost containers for staples. It's a lightweight plastic, yet unusually durable. Lustrex can be crystal clear, or if translucent or opaque color is desired, there's a broad range of molded-in colors to choose from. Lustrex has a satin-smooth surface—non-aging, easy to wipe clean of shelf dust.

What's on your packaging "must" list? Let Monsanto refer you to leading package specialists who can both design and create a perfect package for you. Write Monsanto Chemical Company, Plastics Division, Room 1168, Springfield 2, Mass.

*It pays to package in*

**LUSTREX***

*styrene plastic*

MONSANTO®

*Monsanto also supplies polyethylene and cellulose acetate for packaging.*

Packages by Bradley Associates, Inc.

*LUSTREX: REG. U.S. PAT. OFF.

be the first instantly soluble powder on the market today. Two teaspoons of the new Borden product are added to a glass of milk to produce a homemade chocolate malted. The product will be packaged in 1-lb. cans.

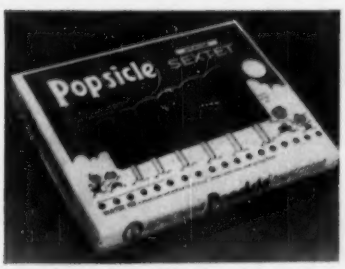
"Borden's Instant Hemo" is a chocolate-flavored beverage mix, fortified with minerals and vitamins. Preparation and packaging is the same as for the malted milk powder.

Borden's gelatin salad and dessert line has been expanded to seven varieties with the addition of mandarin orange, tomato aspic, and grape-cream cheese. The refrigerated salads and desserts are packaged in a 14-oz. reusable clear plastic mold.

## Whips Cream Cheese

Introduced in New York City last month was Temp-Tee whipped cream cheese, processed by Breakstone Bros., Inc. Packaged in a 4 oz. circular carton, the cheese is reported to spread instantly even when ice cold.

The product was first test-marketed in Connecticut, and met enthusiastic acceptance as a ready-to-use spread, for quick no-cook frostings, and for dips and snacks.




**MULTIPLE POPSICLE PACKAGE** holds six joined confections. The Joe Lowe Corp. occupies only 55 cu. in. of freezer space. Called "Sextet", package is also used for processor's Fudgsicle and Chocsicle.

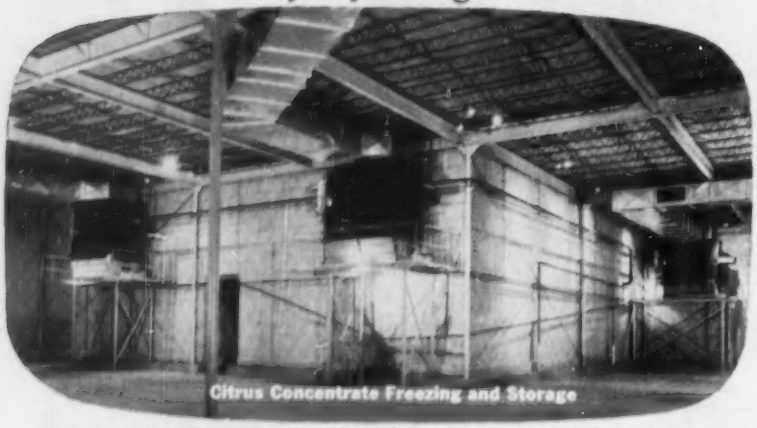
Circle 145A on Reader Service Card

*LUSTREX REG. U.S. PAT. OFF.


# NIAGARA "NO FROST"

**25 Years Successful Experience**

★ *Never any defrosting shutdown*

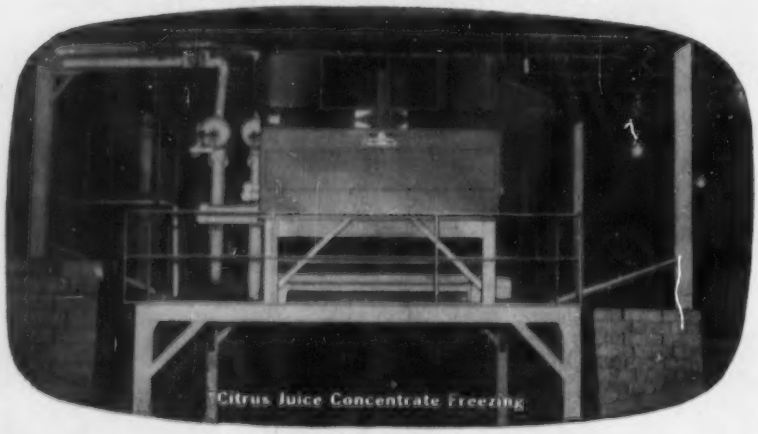


Citrus Concentrate Freezing and Storage

★ *Never a rise in temperature*

Frozen Food Storage

★ *Save Power . . . Reduce Costs*



Citrus Juice Concentrate Freezing

*Write for Niagara Bulletin 105*

**NIAGARA BLOWER COMPANY**

**Dept. F.I., 405 Lexington Ave. New York 17, N. Y.**

*District Engineers in Principal Cities of U. S. and Canada*


## Something New in Beans

The result of two years of research directed at developing a new and superior bean recipe, Campside Beans have been introduced by H. J. Heinz Co. The beans offer a smoky flavor achieved with hickory smoked bacon, ground fine and blended in a sauce containing tomatoes, sugar, salt, vegetable oil, and other ingredients.

According to Heinz consumer research 52% of housewives add bacon or other flavorings to canned pork-and-beans. The Campside Beans will be a true convenience food, says Heinz, in that consumers, will like it "as is".

Price will be slightly higher than that for standard brands of pork-and-beans.

Because of the distinctive flavor and processor's desiring to do an immediate sampling job, the product will be introduced on a "buy two and get one free" basis. Factory assembled units of three cans in a cardboard sleeve will be distributed to retailers during the introductory period.

## New Product Shorts

**Chili Pot Pie**, second in Armour & Co.'s line of prepackaged frozen pies, is in national distribution. A frozen mincemeat pie was introduced last fall.

**Garlic Dressing** has been added to Bill Stern's Famous Brands line. Package is an 8 oz. wide mouthed jar.

**Modern Design Bottle** for Nehi Corp.'s Royal Crown Cola features flat planes with ribbed vertical contour lines. Label is a red diamond shape on a white diamond background, with the trade mark in white letters.

**Frozen Beans and Wieners** have been introduced by Mickelberrys Food Products Co., Milwaukee. The 1 lb. foil carton serves 2-3.

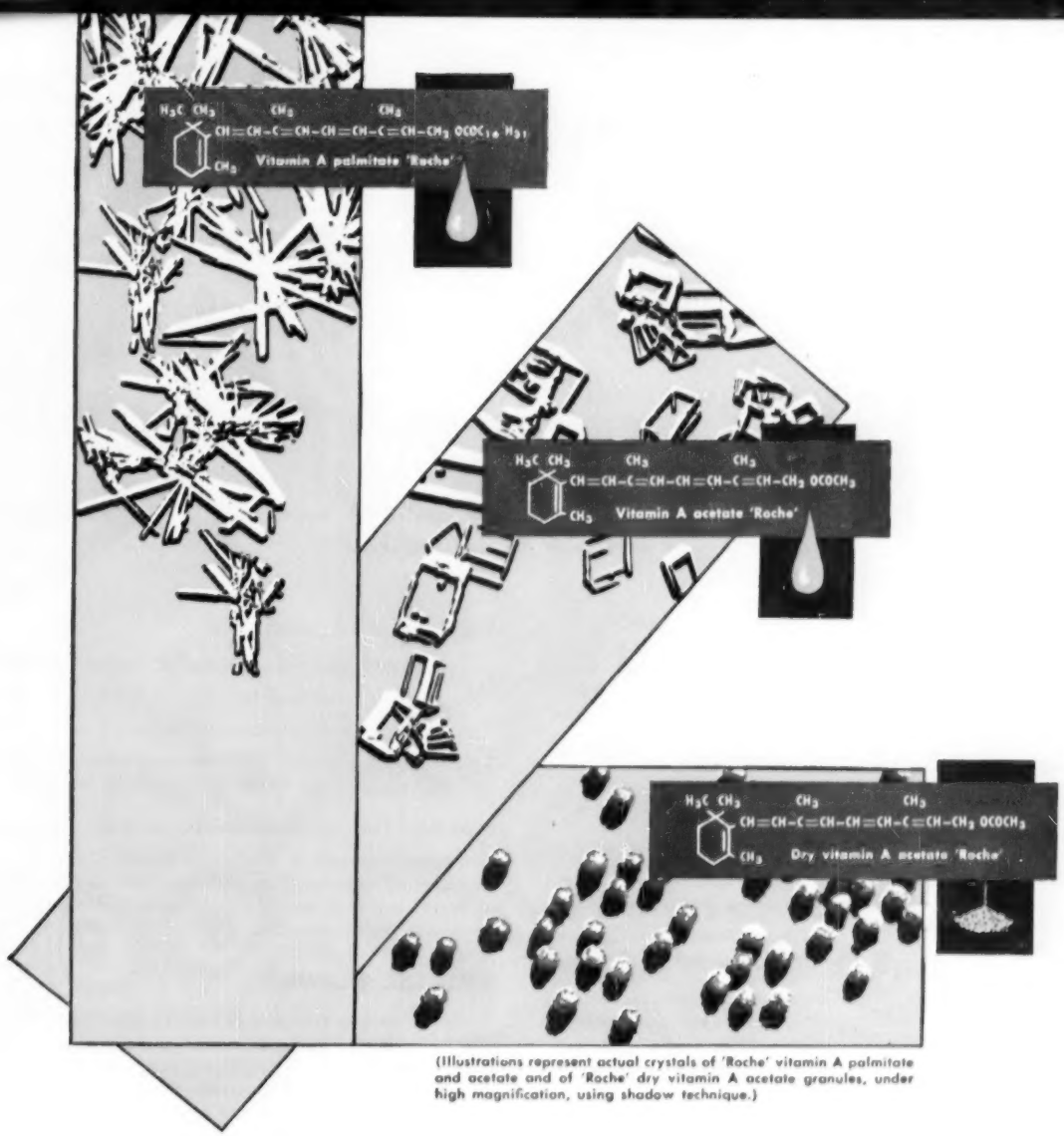
—*End*—

## Precisioned Production

—*Continued from page 57*

timing motor. Latter is powered by a 220v., 60 cycle current. Operating like a non-reset electric clock, it must have an uninterrupted power source.

Chart drive motor and solenoid-actuated stylus are isolated from each other. The motor is activated by the switch that operates the wrapper's motor. Stylus moves in the horizontal plane and is actuated when the wrapper's clutch is shifted from the "on" or "off" position.




(Illustrations represent actual crystals of 'Roche' vitamin A palmitate and acetate and of 'Roche' dry vitamin A acetate granules, under high magnification, using shadow technique.)

# VITAMIN A COMES RIGHT FROM ROCHE

Roche has proved time and again that it is a source of vitamin A far superior to the livers of fish. Look at these advantages of 'Roche' vitamin A—stability • uniformity • no "fishy" taste or after-taste • high purity • constant availability • economy.

Roche produces all the popular types of vitamin A — the liquid types, the dry types, and the special types — to meet the most exacting requirements of purity for margarine and food manufacture, and the most rigid U.S.P. standards for pharmaceutical manufacturing — by the tons, by the famous Roche synthesis.

Roche assures the utmost excellence, the utmost experienced care, and the quality you require. Packaging designed with your needs in mind brings you vitamin A right, from Roche.

**ORDER *right* . . . ORDER *from Roche***

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## HOFFMANN-LA ROCHE INC.

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# *Roche has all types of Vitamin A*
## *-for pharmaceuticals*
## *food products*
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***Take your choice of the following types of vitamin A 'Roche'. They have been made especially with your particular problems in mind.***

## LIQUID TYPES

**Type P1MO vitamin A palmitate**—1,000,000 U.S.P. units per gram, standardized by addition of edible vegetable oil. This type is a highly refined product containing well-proven stabilizing factors of the Roche synthesis. *Experience has shown that this type meets the great majority of requirements.*

**Type P1MO/ BHA vitamin A palmitate**—Same as type P1MO above plus antioxidant protection.

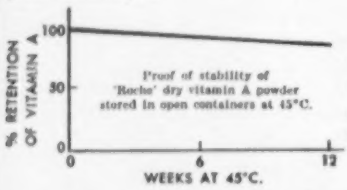
**Type A1MO vitamin A acetate**—1,000,000 U.S.P. units per gram, standardized by addition of edible oil. Contains well-proven stabilizing factors of the Roche synthesis.

**Type P1.3 vitamin A palmitate**—Ranging between 1,350,000 and 1,650,000 U.S.P. units per gram. Contains no oil addition. Ideally suited for oil-free preparations. Stability is similar to type P1MO.

**Packaging**—All liquid types of 'Roche' vitamin A are packed under inert gas in seamless containers. Nominal quantities are shipped in widemouth aluminum bottles. For large orders, a specially-designed aluminum transport can holding 50 kilos is recommended. A dispensing attachment is available.

## DRY TYPES

'Roche' dry vitamin A acetate, and vitamin A and $D_2$, powders have great advantages.




**First,** dry vitamin A acetate 'Roche' has high stability in tablets, hard and soft gelatin capsules, and powdered food supplements.

**Second,** having an irregular surface the Roche product does not separate from other dry ingredients during mixing or vibration.

**Third,** Roche powders do not stick to machine dies and punches. Capping and spring do not occur during compression.

**Fourth,** extrusion loss is low. This advantage comes from the product's excellent resistance to the high pressures found in tablet making.

Powdered food supplements use 'Roche' dry vitamin A and $D_2$ for ease of manufacture.

## DRY TYPES (continued)

The following Roche types have been found most popular:

Type 500-dry vitamin A acetate. 500,000 U.S.P. units per gram.

Type 325-dry vitamin A acetate. 325,000 U.S.P. units per gram.

Type 500 A-50D-dry vitamin A acetate and vitamin $D_2$. 500,000 U.S.P. units of vitamin A and 50,000 U.S.P. units of vitamin $D_2$ per gram.

**Mesh Sizes**: Each type available in two mesh sizes: No. 40 and No. 60.

**Packaging**—All types of 'Roche' dry vitamin A are packed in polyetheylene bags, with protective sealer, in drums and in 1 and 2 kilo tamperpruf metal containers. Small quantities in amber s.c. bottles.

## SPECIAL BLENDS

Roche has various potencies of vitamin A in vegetable oil, alone or with beta carotene 'Roche' or vitamin $D_2$, according to your formula. These are widely used for fortifying margarine and other food products. With a Roche blend of vitamin A and carotene, processors have the advantage of *fortifying* and *coloring* their products in just one plant operation.

Custom-made blends of 'Roche' vitamin A and other oil-soluble ingredients such as vitamin E 'Roche' are also available.

These are packaged in batch size, sanitary tin cans or in bulk packings to suit your manufacturing operation.

## Beta CAROTENE 'Roche'

**Use 'Roche' beta Carotene** to supply *safe, convenient* coloring combined with *nutritional* value for margarine, shortening, butter, cheese, yellow baked goods, edible oils, and other foods.

Beta carotene is the natural coloring matter of butter and other dairy products. It is a constituent of cereal grains, alfalfa, carrots, and other vegetable foods. 'Roche' beta Carotene imparts a *true* natural yellow color to your foods without any trace of green. 'Roche' beta Carotene adds nutritional value; theoretically, one gram equals 1,666,667 millions U.S.P. units of vitamin A activity. Extensive tests show that "Roche' beta Carotene has excellent color stability.

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A visible time recorder reads in minutes and tenths of minutes. It totals up to 10,000 min., then resets at zero.

The electric counter is actuated by a sensitive switch equipped with a spring-loaded toggle arm. Located directly above the wrapper's feed conveyor, it is powered by circuit similar to that of the stylus. As cartons pass it, they trip the toggle arm, sending an electrical impulse to the counter.

#### Codes Give Clues

Any number of code numerals may be used. Here are designations used by Birds Eye in some plants: (1) Carton formers, (2) fillers, (3) lack of product, (4) closers, (5) wrappers, (6) paper change, (7) off-bearer, (8) change hourly product codes, (9) relief period, and (10) lunch period.

When any one of these ten numerals is marked on the chart strip where down-time is indicated, there is, accordingly, quick understanding of the cause of the line shut-down. For easy analysis, the chronological record of each line's operation (by time intervals and cartons produced) is transferred to individual sheets that have columns headed by descriptions identical to those for the code numerals. Added to these sheets is further information detailing reasons for major down-time, along with pertinent notes on productivity.

#### Sets Volume Standards

One of the outstanding results from analysis of the data accumulated has been the establishment of standard line-production volumes. The maintenance of uniform production volume, based upon a certain poundage for each line, has tended to increase total plant output and, when properly attained, it meets standard direct labor costs.

These standards, of course, have some variables. An important one is the variation in raw-product grade or quality. However, this, like other line-productivity variables, is considered in final analyses.

Preventive maintenance, such as proper frequency of machinery lubrications, overhauls, and such, can be set safely by these chronological charts. The development of an operation history of each machine in the line provides a means of analyzing machine efficiency. It also helps determine the responsibility for the need to replace worn or inferior machine parts.

*End (Resume reading on page 58)*

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# ADVANCES IN TECHNOLOGY

### Improved Fruit Pie-Filling

Filling the interstices of uncooked fruit with unswelled starch is the crux of a patented process for making canned fruit pie-filling.

Clean washed fruit is delivered to a conventional filling machine which deposits a predetermined quantity in cans. Latter are then subjected to a vacuum of 25-27 in. to remove occluded air and gases from the interstices of the fruit.

While under vacuum cans are filled with syrup carrying suspension of unswelled starch. Then they are capped and sealed under 6-10 in. of vacuum, and cooked for a time and a temperature sufficient to sterilize contents and gelatinize or swell the starch.

It is claimed that the process enhances color, flavor, form, and texture of the cooked fruit, and that these properties do not suffer during the baking of pies or other pastry in which the filling is used.—U.S. Patent 2,755,190, July 17, 1956.

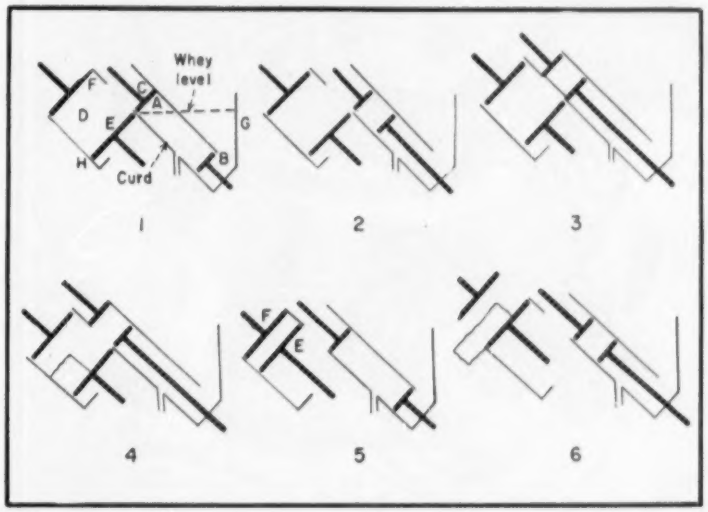
### Modified Milk Proteins As Eggs Substitutes

A modified milk product that may be used to replace up to 50% of the egg in a sponge cake formula without alteration in mixing or baking conditions, has been developed by the Dairy Research Section, Commonwealth Scientific & Industrial Research Organization, Melbourne.

An attractive and palatable milk sponge cake may also be made with the new product in which egg is completely eliminated. This cake has a different color and flavor, crust and crumb texture than the egg sponge, but is an unusually good one.

Product is made from fresh skim milk with lowest possible fat content. It is concentrated to 25% solids and cooled to 70F. Then a 3½% solution of sodium hexametaphosphate is added and the mixture heated to 140F. in 15-30 min. At this stage, pH is 6.5.

When 140F. is reached, a buffer solution (4% TSP and 0.7% NaOH) is added to bring pH to 9.0. Mixture is cooled to below 87F. and spray dried. Powder should have pH of 8.0.—*Dairy Industries* (Australia), 287-91, April, 1956.




## Mechanical Cheddaring of Curd Mass Speeds Up Cheesemaking Process

A reduction of more than 85% in the time required to perform the cheddaring operation in the manufacture of cheddar cheese is expected to result from use of a new Australian curd fusing machine.

Purpose of the machine is to mechanically develop a close texture in the curd before it is hooped. This has been found essential in preventing an open texture in the finished cheese. Previously, cheddaring in the cheese vats, a step requiring from 1½-2½ hr., has been the only successful method of obtaining this texture.

Machine comprises two vessels placed one above the other, First vessel (A in illustration 1 above) is inclined at 45 deg. Part of its upper wall is perforated with ⅜ in. dia. holes as are also ends of plungers (B and C). Communicating with this cylinder is oval chamber (D) with plungers (E and F). Bottom of (E) is also perforated. Trough-like extensions (G and H) are for collecting whey from the curd.

With plunger (B) in position shown at (1), slurry of curd and whey is pumped from cheese vat to cylinder (A). Here, the curd is retained and the whey passes through the corrugations to trough (G). Level of whey in (G) is maintained above accumulated curd (dotted line) to aid in the matting process.

When vat is emptied, plunger (B) moves upward (2) compressing curd against (C). After about 10 min., (C) is retracted allowing (B) to move upward until curd mass is opposite opening in top chamber (3). Curd then falls into (4).

Plunger (E) moves up compressing curd against (F, 5). In about 15 min. (F) is retracted (6) allowing plunger (E) to move forward and push curd mass above wall of chamber and out of machine.

Curd is now ready for milling, salting, and hooping. Cheese made by this method has a close texture similar to that made by conventional cheddaring. Time required for this step is approximately 15 min. Australian patent application No. 16,-977/56 has been filed covering the machine.—*Australian J. of Dairy Technology*, 58-65, April-June, 1956

### Sources of Bone-Taint

During a study made at the plant of the Wellington (New Zealand) Meat Export Co. on 24 bone-tainted carcasses over a 3-year period, large numbers of Gram-positive rod bacteria were isolated from the sides, including at least 12 different species or strains. These included anaerobes,

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While the Gram-positive rods were frequently found in the synovial fluid, in one case of bone-taint that developed very quickly the synovial fluid was sterile and the hip-joint was untainted. Nor does the organism seem to spread from the marrow of the femur, since marrows of tainted sides did not always contain Gram-positive rods.

The lymph nodes appear to be the foci from which the organisms spread, *post mortem*. Infection seems to enter animals from small wounds, chiefly during dry, dusty weather, since number of infected lymph nodes tends to decrease in rainy weather.

Once infection gains access, the organism spreads through the lymphatic system to the nodes where it may survive for some time. After death and the post mortem depletion of leucocytes the bacteria multiply and, if cooling and pH reduction are not fast, their proliferation becomes detectable as taint.—*Journal Science of Food & Agriculture*, 7(8), 546-51 1956.

## Pre-Cooking Does Not Effect Meat Tenderizing by Papain

Experimental studies in the tenderizing of beef with papain have revealed some important factors in the effectiveness of the process.

Penetration cannot be accomplished by natural diffusion or by papain's hydrolytic activity. Physical incorporation should be used, possibly by thoroughly forking the papain into the meat. Penetration by immersion in solutions of papain amounted to only about 2 mm.

Data obtained from a study of precooking showed that holding periods of 1 and 5 hr. between treatment and cooking had no significant effect on the tenderizing process, and that such holding periods are unnecessary.

Microscopic studies of enzyme action on meat coated with papain powder showed no evidence of activity after 3 hr. exposure. On the other hand, coated meat broiled or cooked in a pressure cooker showed marked changes in structure of the tissues.

The tenderization mechanism is probably hydrolysis of muscle-fiber protein, which accounts for ¾ of the edible portion of beef. Hydrolysis reaches a maximum at temperatures of 140-176 F.—*California Agriculture*, 10 and 15, Oct. 1956.

## Penetration of CTC Into Fish Muscle

Chlortetracycline (CTC) is probably the most effective preservative for fresh fish yet discovered.

It has been difficult, however, to study the amounts absorbed by the fish flesh during ice storage, or its destruction on cooking. This is due to the fact that extracts of normal muscle of many species of fish give inhibition zones in the usual pad plate method of microbiological assay for this antibiotic.

Flesh extracts of gray cod (*Gadus macrocephalus*), however, give such fictitious assays only occasionally. This species may, therefore, be used for the study of the fate of CTC used for preservative purposes.

When fish is stored in ice containing 1 mcgm./g. CTC for up to 10 days, very low penetration occurred, and that largely through the thin skin lining the visceral cavity or on other pieces containing portions of external skin, and only after 5 days or more of storage.

In fish held refrigerated in sea water containing 2.8 mcgm. CTC/g., penetration occurred earlier, but again mainly in pieces containing visceral or skin areas. Heating, such as would occur in cooking, destroys a very large proportion of the CTC.

Average content of whole eviscerated fish stored in ice containing CTC was not determined, but it is probably not more than 0.01-0.02 mcgm./g. for storage periods of not more than 10 days.—*Canadian J. of Technology*, 34(4), 215-19, 1956.

## Changes in Cottonseed Fats During Moist Storage

Cotton seed deterioration during moist storage may result from a slow free fatty acid formation by enzymes, as well as from a much more rapid change due to growth of microorganisms.

In a study of the changes in cottonseed fats those samples which contained at least 10,000 lipolytic molds and bacteria per g. also had high free fatty acid contents. Samples with low free fatty acid sometimes contained a large number of lipolytic bacteria, but none of these had large numbers of lipolytic molds.

Sixteen species of lipolytic molds were identified and seven species of lipolytic bacteria, but unidentified lipolytic species of both molds and bacteria were also found.

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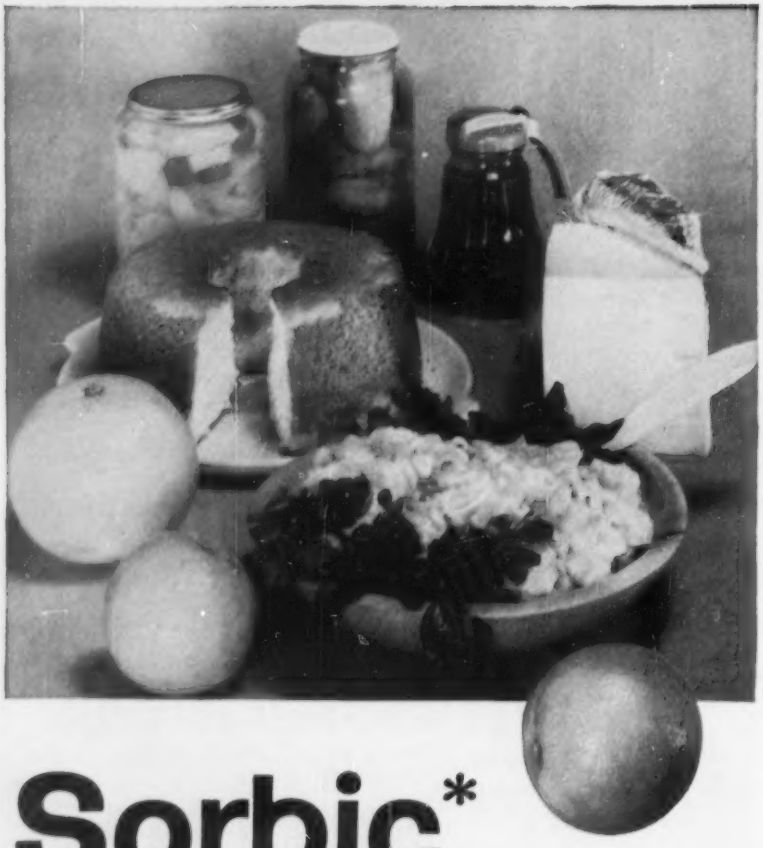

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into five groups: (1) *Xanthomonas*-like species of bacteria using very large amounts of neutral fat and forming large amounts of free fatty acids, (2) *Aspergillus* and *Penicillium* species of molds using large amounts of fat but accumulating moderate amounts of free fatty acids, (3) *Aspergillus flavus* strains using large amounts of fat but producing small amounts of free fatty acids, (4) Various molds and *Pseudomonas* species of moderate lipolytic activity, and (5) weakly lipolytic Gram-positive rods. Seeds of poor quality usually harbored organisms of high lipolytic activity. —*Applied Microbiology* 4(5), 263-73, 1956.

## Fruit Surface Contamination Is Juice Coliform Source

Frozen orange juice, both single strength and concentrated, has been found to contain coliform bacteria often enough to require investigation of the origin of these organisms and their significance to the quality of the product.

When plate counts were made on sterile water used to rinse oranges taken aseptically from different locations on trees, and from different parts of packing houses and product plants, 106 out of 228 samples gave positive coliform counts. In 44 samples taken from trees, 9 were coliform-positive, but only one (from "inside the tree skirt within 3 ft. of the ground") was positive for *E. coli*.

Of 87 packing house samples, 26 were positive for coliforms, with three having *E. coli*. Coliforms were found in 71 out of 97 samples from product plants, 17 of them containing *E. coli*. Positive coliform samples were due mostly to *Aerobacter* species. Rough handling of fruit in packing houses and product plants is the greatest factor in the increase of coliform bacteria in orange juice. Human handling does not seem to be a factor, nor does the presence of coliforms indicate insanitary conditions in a plant.—*Applied Microbiology* 4(5), 250-53, 1956.

## Dormancy of Barley Influences Malting

Dormancy, the lack of germinating power in seeds for a variable period of time after harvest, is of little consequence to most industrial users of cereal grains.

With barley, however, malting is

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# You Can Save Money on Water Softening—With a "Lixator"

Today, a great many companies using zeolite water softeners are faced with this problem: While the water softener (which needs periodic regeneration with brine) gives excellent performance—regeneration is often costly, time-consuming, and causes substantial waste of salt. This is generally the case when salt is dissolved to form brine without the proper controls.

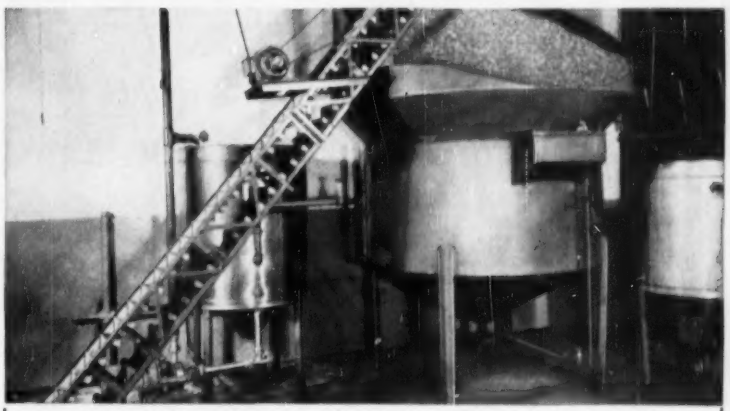
In most plants, however, it *is* possible to reduce this high cost of water-softener regeneration. The method is simple and effective: Always regenerate with pure, fully saturated brine—the type of brine made in a Sterling Lixator. Here are some of the reasons why Lixate Brine can save money for users of zeolite water softeners . . .

**The Sterling Model Lixator** is the most efficient and economical rock-salt dissolver ever developed. Wherever this fully automatic unit is used in water softening, it reduces the amount of salt consumed . . . eliminates dry-salt spillage . . . and simplifies the entire brine-making process. Developed and patented by the International Salt Co., the Lixator combines rock-salt dissolving and brine filtration in one simple operation. It delivers fully saturated crystal-clear brine *automatically* to any point within a plant. The Lixator is also remarkably easy to maintain, and has no moving parts to get out of order.

**In operation,** a Lixator need not replace the salt-dissolving tanks furnished by water-softener manufacturers. Instead, Lixate Brine is piped to these tanks—which then serve as the storage and measuring tanks from which brine is withdrawn for use.

**Salt handling reduced.** Because Lixate Brine is *piped* to points of use, the work of hauling dry salt from storage piles to the location of the water softeners is eliminated. Also, because of this direct-piping feature, the Lixator (and the salt that feeds it) can be placed anywhere in the plant, to make the most efficient use of available space. With a self-feeding hopper for salt, the Lixator operates automatically, without attention, and with little or no salt handling.

Lixators are made in a variety of types and sizes— to meet the brine needs of individual plants. The principle by which they operate can benefit the largest factory, or even a plant of moderate size.



**At the Libby, McNeill & Libby plant** in Hartford, Wisconsin, this Sterling Model Lixator is used for efficient, low-cost water-softener regeneration. A mechanical conveyor fills the Lixator hopper from a nearby rock-salt storage pile. In *your* plant, a Lixator can also produce substantial savings on salt—and in salt handling as well.

**Complete regeneration.** Since Lixate Brine is always 100% saturated, it provides complete water-softener regeneration each time. This means that extra regenerations—with the consequent use of more salt— are eliminated. Still another advantage results from using Lixate Brine: Water-softener operators will not use any more of this brine than is needed for each regeneration. What often happens in the case of unsaturated brine is that excess amounts are used in an attempt at complete regeneration. In the long run, this always results in a costly waste of salt.

**Keeps water softeners clean.** Besides being fully saturated, Lixator Brine—produced in a Lixator from economical grades of Sterling Rock Salt—is also self-filtered, and free from insolubles or other foreign matter. As a result, it will not introduce dirt or other "clogging material" into the zeolite bed of the water softener. This has proved to be a particular advantage in industrial water softening—because the zeolite stays in good condition longer. Lixate Brine is also free from acids or alkalies. Thus, being neutral, it cannot adversely affect the performance of any zeolite water-softening system.

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Steam-gunning with a hot detergent solution isn't new. What's new is a steam gun that is not heavy, not dangerously hot, not cumbersome. All these disadvantages are completely eliminated in the new Oakite "Hurriclean" Gun.

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**Safe . . .** Here is a gun that's cool to the touch, hour after hour. The inner tube carries steam, the outer tube carries the cool detergent solution. There are no dangerous hot spots.

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Find out how the "Hurriclean" gun can save you money by speeding up sanitation of your processing and handling equipment . . . and also cut costs on maintenance cleaning of floors, walls, equipment . . . and on special jobs like paint-stripping. Call your local Oakite representative, or write for booklet F9737 to Oakite Products, Inc., 27A Rector Street, New York 6, N. Y.

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impossible until the dormancy period expires. Also, it is difficult to judge whether a barley is suitable for malting, since germination tests on dormant kernels are hard to make with any accuracy.

Dormancy varies with the crop year and the growing conditions. Barley of the 1954 crop in England, harvested in a wet year and inadequately ripened in the field, had pronounced dormancy, while the 1955 crop, grown and harvested in a dry sunny season, exhibited no dormancy in a high proportion of samples.

Proper storage and drying tend to reduce the length of the dormant period. It has also been found that a number of compounds added to the water used for steeping prior to germination promote germination during the dormancy period. Samples that germinated only 26-87% after a water steep, for example, germinated 87-100% after steeping in 0.05% $H_2S$ solution.

Sulfhydryl (—SH) compounds of several sorts were effective in reducing dormancy when added to steep waters. Sodium hydrogen sulfide had a very minor effect and $Na_2S$ was not effective.

Many of these compounds are able to inhibit phenol oxidase and it is tentatively suggested that this enzyme, which contains copper, is bound up with the dormancy phenomenon. Metal-binding compounds such as 8-hydroxyquinoline and dimethylglyoxime will also combat dormancy—*J. Inst. Brewing* (Nutfield, Surrey). 323-33, July-Aug. 1956.

### Dextrose to Levulose By Ion Exchange

Interconversion of dextrose in corn syrup into its much sweeter isomer, fructose or levulose, is the object of a patented process and apparatus.

Invention is based on discovery that basic ion exchange resins are efficient catalysts in making this interconversion provided the reaction is carried out in absence of air or oxygen.

Properly executed, the process is accomplished with only small sugar loss, without formation of dark brown colored bodies or development of objectionable flavor, and without contamination of the reaction solution by intrusion of acid substance.

Apparatus comprises a syrup tank, resin column, and tank to receive treated syrup. All are connected by suitable piping, and a pump is pro-

vided to circulate syrup until desired interconversion is obtained. Piping and headspaces of tanks and column are filled with nitrogen or other inert gas, and syrup to be treated is boiled to expel oxygen.

In one test conversion of dextrose to levulose was 32%, and loss of dextrose was 8-12%. Final solution was sweet, with no objectionable flavor, and water clear.—U.S. Patent 2,746,889, May 22, 1956.

### Sucrose Alters Pastes, Gels Of Starches and Flours

Hydration of starch granules in pastes containing sucrose is inhibited by this ingredient. But pastes made of wheat flour show markedly higher maximum and terminal viscosities and gels that tend to be firmer in the presence of sucrose.

This was determined when corn, wheat, non-gelling waxy-corn starches, and wheat flours were made into pastes containing 4 different concentrations of sucrose (15.9, 23.7, 31.6, and 39.5g./100g. water).

Physical properties studied were: (1) Pasting characteristics and viscosity of hot pastes; (2) rigidity and water-holding capacity of gels, and (3) number and size of swollen granules for a given weight of dry starch.

Initial viscosity rise of waxy-corn, and corn starches, and of the flours occurred at progressively higher temperatures as concentration of sucrose was increased. Pastes of wheat starches exhibited little or no change.

Gels of corn and hard-wheat starches decreased slightly in rigidity when prepared with 15.9g. sucrose, but those of soft-wheat starch were slightly more rigid. With 23.7g. sucrose, rigidity of starch gels decreased, and with higher sucrose concentrations pastes rather than gels resulted.

Soft-wheat flour gels became more rigid as sucrose concentration was increased to 23.7g., but with 31.6g. sucrose they collapsed after 30-60 sec. Hard-wheat flour gels showed a progressive increase in rigidity with each increase in sucrose.—*Cereal Chemistry*, 91-101, March 1956.

### Many of the Trace Elements Occur in Cacao Beans

Cacao beans and shell contain the trace elements, Fe, Cu, Mn, Zn, Al, As, Mo, Fl, and Pb in amounts that differ with origin of the beans.

There are also marked differences between shell and shell-free beans.


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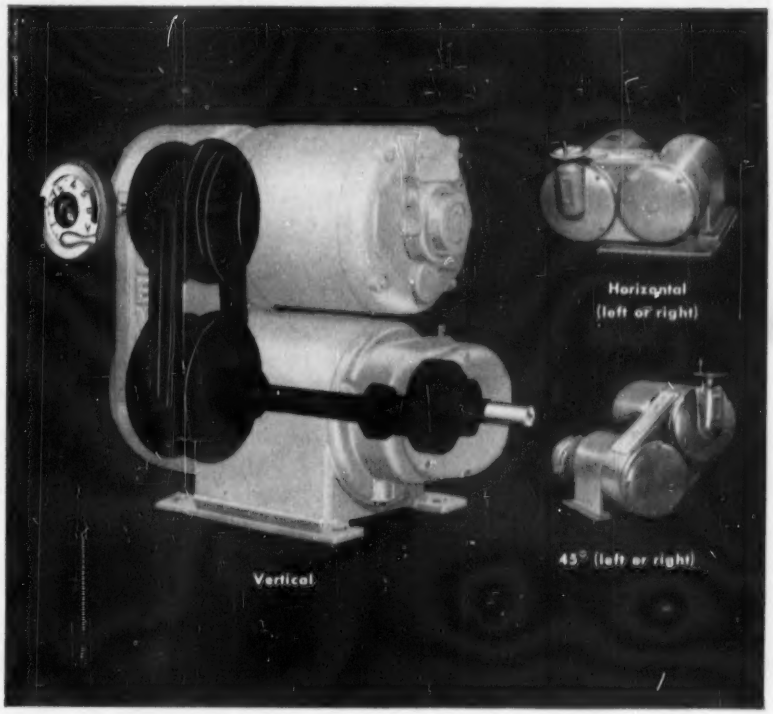


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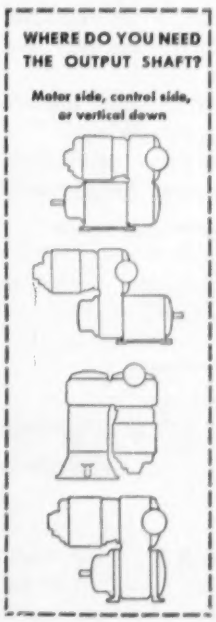


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**PECTIC ENZYMES**
*for the hydrolysis of pectins in fruit and fruit juices to speed processing and to make fruit juices sparkling clear for consumer appeal.*

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For example, none of the 6 sorts of beans (Congo, Lomé, Carenero, Arribe, Trinidad, Accra) contained Al, but shell from these beans contained 171-412 ppm. Shell with 194-575 ppm. Fe has 6-19 times as much of this element as the shell-free beans.

Shell tends to be much higher in Fe, Cu, Mn, and Zn than beans. Arsenic occurs in roasted beans at a level of 0.3-0.4 ppm., Mo 0.1-0.7, while Fl is found in amounts of 1-2 ppm. in both shell and beans. None of these amounts exceed those occurring normally in plant products.

Ratio of Cu to Fe is much higher for beans than for shell (beans, 0.493-0.766; shell 0.056-0.214). This is also true for the Mn: Fe ratio (0.566-1.161 for beans; 0.066-0.204 for shell).

The relatively high levels of these trace elements in cacao indicate that these products can contribute significantly to the requirements of the human dietary for Cu, Fl, Fe, Mn, Mo, and Zn.—*International Chocolate Review* 11(9), 374-84, 1956, (in French and German).

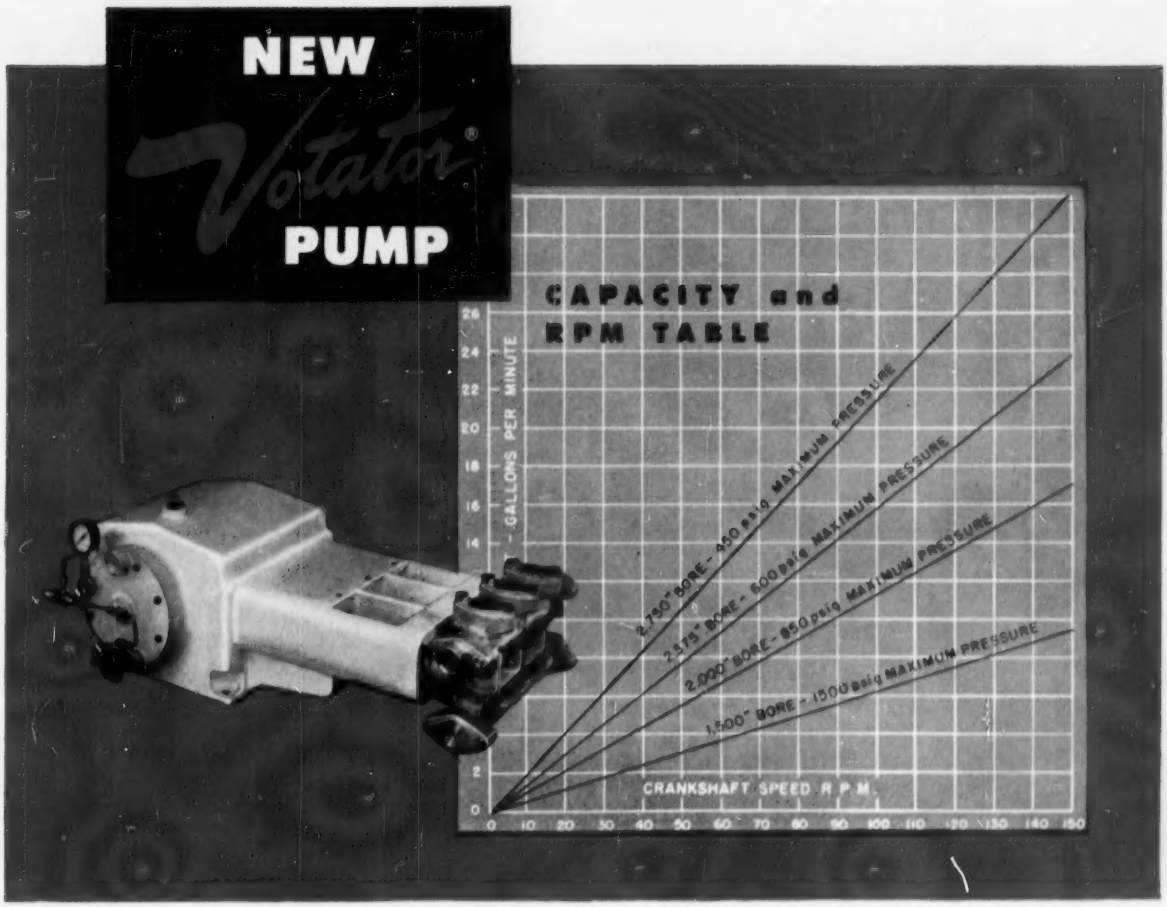
## Under-Water Vacuum Test For Sealing Efficiency

Chocolate tablets or other confections that are hermetically sealed by packaging machines can be readily tested for vapor- and moisture-tightness by immersing in water contained in a vacuum desiccator and evacuating it.

If pressure is reduced in steps of 100 mm. of Hg and held at each stage for 1 min., the pressure at which air bubbles begin to escape from the packages may be noted. In addition the packages may be opened after atmospheric pressure is restored to the desiccator, and those containing water may be counted.

Test is simple and rapid, results are readily treated by statistical quality control methods, and both performance of packaging machine and wrapping material can be checked by it. Leaks may occur either at the sealed seam or at pinholes or pores in the wrapping material.

When test was first applied to output of a machine the average vacuum at which leakage began was 195 mm. Hg (565 mm. Hg pressure); after 3 months of operation and regular checking, leakage point had increased to 321 mm. Hg 439 mm. pressure).—*International Chocolate Review,* 11(9), 386-92, 1956 (in German).

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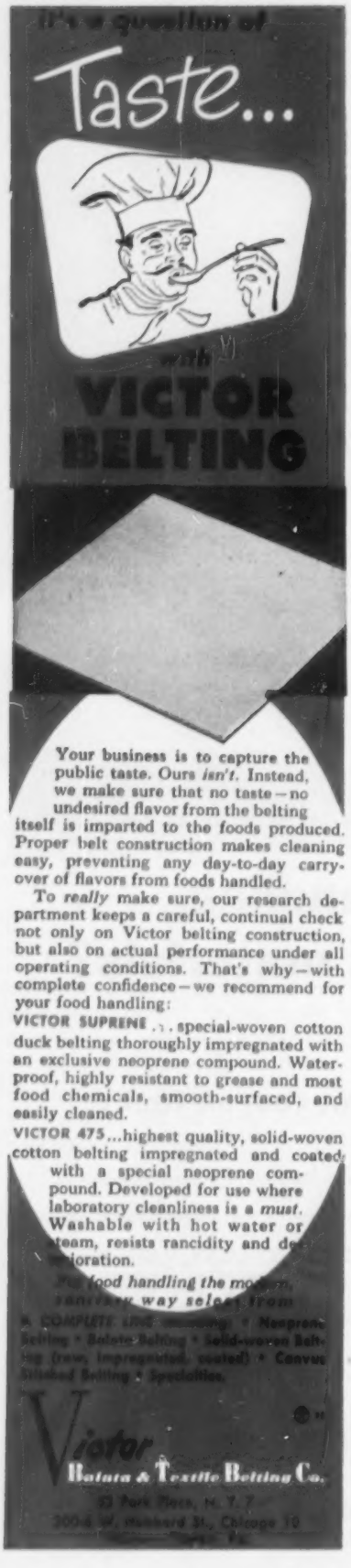
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## Food Additive Scrimmage

—*Continued from page 52*

in favor of an impartial advisory committee. An even number of members would be chosen by industry and by government, with committee thus formed choosing the last member.

What enforcement policy is likely to be encountered if a food-additive law comparable to the Miller Act is passed?

**Feeling of some observers is that the FDA is still dedicated to the concept that nothing should be added to natural food.**

**This has been commented on before in various writings and, despite protestations, the day-to-day rulings (as well as the government attitude toward the proposed legislation) lend considerable support to this fear.**

**In fact an analysis of FDA rulings gives some observers the impression that the government aim is to "freeze all recipes at the 1890 cook book level."**

### Toxic on What Level?

Consider, for instance, the government interest in the subject of utility. It is FDA's position that no toxic substance should be used—even if it is found to be safe in the quantities proposed—unless it has a functional value.

It hardly need be pointed out that nearly every substance may have a toxic effect at some level of use. Consequently, such a provision would enable FDA to pass on the utility or functional value of almost every item that goes into the food supply.

The difficulty is that functional value or utility frequently cannot be determined on an objective basis. An additive may be regarded as useful and desirable by industry and by many consumers, yet may be looked upon by FDA as inappropriate or undesirable. The inevitable tendency of such an approach would be toward regimentation of the consumers' food supply rather than the protection of the public health, which should be the purpose of the proposed legislation.

### Declaratory Judgment Plan

There is, in truth, no place in the traditional scheme of the FD&C Act for regulation of the kind of food available to the consumer, aside from the fundamental protection of his health and pocketbook, for which the Act was designed.

Industry, thus far, has tried to present a procedure that would safeguard against possible arbitrary official domination over food improvement policy. The declaratory judgment plan was the result of this effort. Briefly, it was designed to provide an opportunity for any aggrieved party to have a Federal District Court pass on the facts in case of disagreement.

The Judicial Conference (of judges of the U. S. Circuit Courts of Appeal) objected to the declaratory judgment bill because of the burden placed on the District Courts and because it constituted a departure from the Administrative Procedure Act, which provides for appeals from Administrative Agencies directly to the Circuit Courts of Appeal.

### Good Reasons—But Not Appreciated

The latter procedure makes it virtually impossible to reverse an Agency decision, because a court must uphold the Agency decision if it is supported by any substantial evidence. Here, industry has felt that the extraordinary circumstances surrounding the food additive proposals justify a departure from the Administrative Procedure Act.

The declaratory judgment proposal, in itself an extensive enlargement of FDA authority, was also objected to by the FDA for reasons which suffered under fire from the House Committee as well as from able industry spokesmen. If may be observed that neither the Judicial Conference nor the House Subcommittee appeared fully to appreciate the reasons justifying the industry position.

### Chances of Court Appeals

Recently, a new factor has entered the picture as a consequence of the contemplated elimination of the rule requiring an administrative decision to be upheld by a reviewing court if it is supported by substantial evidence.

The proposed change would require the reviewing court to reverse the Agency decision where it is based on findings of fact that are clearly erroneous on the whole record.

There is a difference of opinion as to the value of this change, and the matter will be debated for some time to come, since it goes to the heart of all federal administrative appeals. Whatever the change may mean, the point is that no remote, cumbersome, and expensive appellate procedure is likely to be of any practical value in protecting against the pitfalls inherent in legislation that provides for a binding administrative

determination of the safety question.

Enforcement of such a food-additive law, without adequate judicial review of the facts, will be largely a matter of opinion of the imposing Agency, and no appellate procedure addressed merely to legal points can provide the review necessary to balance that opinion against other expert opinion. This situation is clearly distinguishable from the other areas where federal regulation is required to prevent a chaotic condition.

**In the determination of safety, there are few if any facts that do not require subjective interpretation, and the opinion of a handful of men, without responsibility for the success or failure of a major industry, could dominate its policies in this area.**

The nebulous character of this problem and the exposure to arbitrary decisions fully justify the employment of procedures necessary to insure adequate review. As has been pointed out in numerous able statements, the burden on the Courts, if some form of *de novo* (fresh start) trial of the facts is made available, would be negligible.

### Ample Precedent for Court Review

After all, the Courts are here to serve the ends of justice, and it is inconceivable that this purpose can be defeated merely because of blind dedication to a procedure that is inadequate for a particular situation.

Such procedure, which is not exceptional, has been made available in other areas for less impelling reasons, so there is ample precedent for the type of appeal recommended by industry.

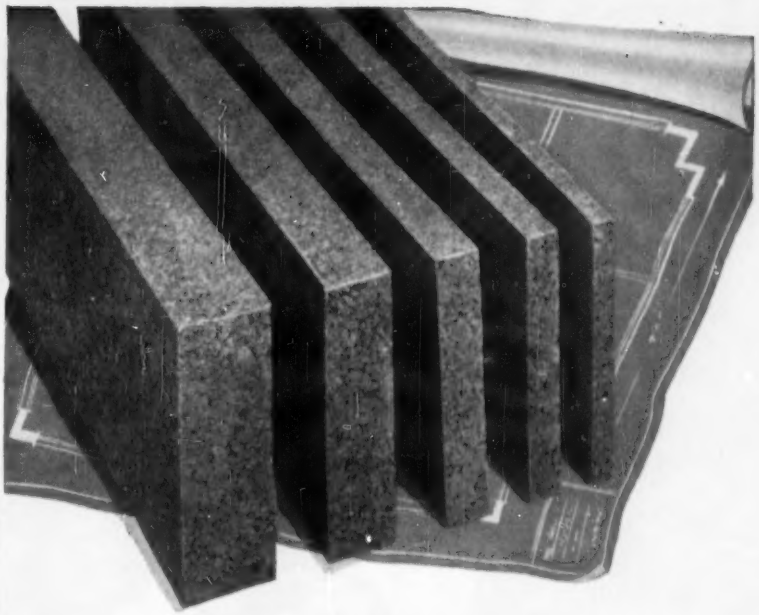
It would appear that a possible area of compromise on procedure might be to permit the promulgation of reasonable regulations under the usual procedure, but to grant industry the alternative right to have an independent court trial of the facts similar to the procedure provided under the patent law.

This tried and proved procedure is a civil action in the nature of a review as well as a *de novo* proceeding, and it is alternative to the right to appeal to the Court of Customs and Patent Appeals. The mere existence of this right would be a healthy deterrent to arbitrary action.

**Let it be remembered that the proposals now under consideration will materially alter the climate which has fostered the advanced technology responsible for the bountiful and safe food supply which we enjoy today.**

**Unwise legislation could be a grave blow to progress.**

*End* (*Resume reading on page 53*)

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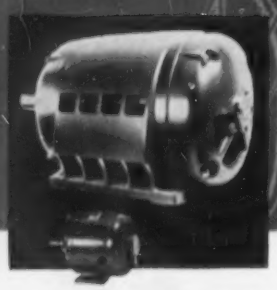

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# QUESTIONS & ANSWERS

## THIS MONTH'S PROBLEM

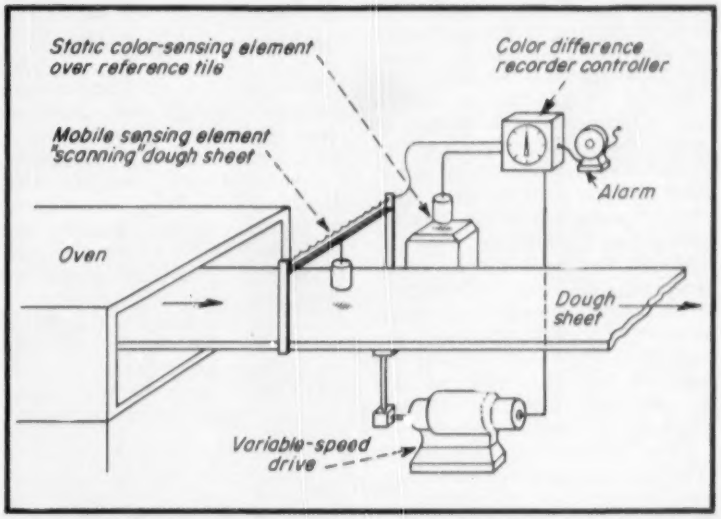
### German Potato Salad

*Question—Can you outline a good basic formula for preparing a canned German potato salad?*

## *OCTOBER PROBLEM*

### Baking to Uniform Color

*Question—I'm running a continuous sheet of dough through a band-type oven and finding it extremely difficult to bake it to a uniform color. Have you any suggestions on how I can automatically control color of the baked sheet of dough?*




**Photoelectric Unit Checks Color of Baked Products**

Answer—A photoelectric pickup—perhaps one with special lens to isolate correct value for dough tint—could be moved in sweeps over the dough (drawing). This pickup would form one part of a balanced bridge.

Another similar matched pickup could be statically mounted (under the same light and environmental conditions) over a dough sheet with optimum color, or over a reference tile with desired color. Unbalance between the two readings could drive an electronic potentiometer either right or left of midscale (midscale being zero, the optimum color point). Deviation from zero could be scaled in units of dough color (plus or minus).

An alarm could easily show deviations on either side of zero. A fast ring could indicate that the dough is too dark. A slow ring could signal a light dough.

Automatic control could be devised by using a proportioning (possibly plus reset and derivative) electric control in the instrument regulating a variable speed motor on the oven drive. Or it might be achieved with use of a pneumatic control system tied into the variable-speed drive.—*Lloyd E. Slater, Managing Editor of Control Engineering,* (a McGraw-Hill Publication) *New York City.*

### Speed and Overfills

*Question—We are filling a food product into glass jars using a positive-displacement volumetric-type filler operating at about 250 per min. This is our newest and fastest line and we haven't had too much experience with it.*

*However, we are very much concerned with keeping "giveaway" loss due to overfill to a minimum. Can you offer any suggestions for controlling this important economic factor?*

Answer—You are correct in looking into the overfill problem. At your operating speed, a very small loss per jar can amount to a surprisingly large annual loss. For example, an average overfill of only 0.1 oz. per jar could cost about $3,500 per yr., if the machine ran 450 min. per day, 200 days per yr., and value of the product were only 10¢ per lb.

You would have to invest nearly $88,000 at 4% interest to equal that amount. Or the loss could be put into terms of how much product you would have to sell to realize that much net profit. This figure probably will be startling.

Fact that you are using glass jars makes direct net-weight checks on filled jars a little difficult. As you know, tare weights of individual jars are very apt to show considerable variation.

We recommend that your quality-control department set up statistical quality-control charts at this filler, with permissible limits shown. Frequency of net-weight checks should be carefully worked out to take into consideration such important factors as time required to fill each batch, and adequate sampling of the performance of each filling piston. Net weight checks are most easily made by pre-weighing a number of empty jars, identifying them conspicuously,

## HOW TO DO IT?

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and putting them through the filler before final weighing.

Once sample frequency is established and results are plotted on the control chart, it will be quickly evident when filler performance goes out of control. Immediate corrective steps can then be taken.

It may be necessary to make a filler adjustment for a change in product density when changing from one batch to another. Or, an adjustment may have to be made (less often) to compensate for gradual wear within the filler.

Should your product be subject to variations in filling temperature, which cause differences in fill weight because of density changes, you might look into a recently developed accessory (Crown Cork and Seal Co., Baltimore, Md.) for automatically changing the filler adjustment.

This temperature compensator consists of a temperature-sensing element immersed in the product in the filler bowl, and a servo-mechanism which automatically adjusts the fill volume to correct for temperature changes. This is certainly a big step in the direction of "automation" of filling, and one that should pay off at your line speed, especially if your product happens to be a fairly costly one.

## Continuous Moisture Control

*Question—Do you have any information on operation and maker of an in-line, continuous-automatic moisture controller which, I understand, is being used for rolled oats and dry dog food?*

Answer—You're probably referring to the Rogers moisture controller developed by the Mechanical and Electronics Product Division of the Quaker Oats Co., Akron, O.

This simple, 2-unit instrument continuously measures, indicates, records, and controls moisture content of free-flowing solids. It consists of a forced-feed test cell and recorder-controller.

About 5% of the main stream is cut out and fed through the test cell at a 100-to-200-lb.-per-hr. rate. Cut-out stream is then forced between cell's electrode plates, which measure di-electric effect by capacitive reactance, and then is conveyed back to main stream without loss or damage to product.

Very accurate control of moisture is possible, with higher accuracies attained for smaller size particles. For example, moisture content of a material classified between No. 16 and 20 screens can be measured to within ±0.2%.

## Tank Repainting Chore

*Question—Our steel bean-soaking tanks have brought about a maintenance problem. They are glass-lined, but the outside steel surfaces are protected with paint. In using these tanks, we find it advantageous to overflow them frequently, and the soak water sems to destroy practically every paint coating that we have tried.*

*Tanks are in almost constant use, and we are allowed very little time for the frequently necessary re-painting. Can you suggest how we might overcome this problem?*

Answer—Because your repainting jobs are always rushed, it is quite possible that you never have sufficiently dry metal surfaces on which to apply the protective paint coating. It is usually very difficult to obtain lasting protection unless the prepared metal surfaces are dry.

Next time you are scheduled to do a repainting job, attempt to dry the tank surfaces temporarily by setting up a fan of the "man-cooler" type (one with a nozzle for directing a high velocity air stream) along with a steam coil or unit heater element. The hot air blast on the tanks should materially assist in obtaining a bond for the paint.

Secondly, we recommend that you consult with manufacturers of industrial paints and finishes for their recommendation on best type of paint for this application, and their recommended method of preparation and application. There are now on the market paints which are said to be applicable to damp surfaces. Also available are paints containing fungicides to resist the deteriorating effect of mold and mildew, which may be present because of moisture conditions during regular use of tanks.

In fact, if you have several similar tanks it would be worthwhile to obtain comparable recommendations from three or four paint suppliers. Each tank could then be carefully treated in accordance with instructions. And a full-scale test under operating conditions could be set up, in order to determine which finish gave the longest lift for the lowest overall cost. We are sure you would find the paint companies anxious to cooperate.

Remember that the cost of the paint itself is often less than the labor to apply it. The most expensive material (on a cost-per-gallon-basis) may give the lowest cost in the long run, if it outlasts the others and thus requires fewer applications during the life of the tank.

One further approach which you might wish to try is a purely mechanical expedient, intended to reduce the severity of exposure. It is to construct and install metal collars around the top edge of the tank sheet, similar in shape to a doughnut sliced horizontally through the middle. Each of these collars could then be fitted with a sheet metal down-spout for carrying off tank overflow and keeping it off painted surfaces. This would at least eliminate the erosive effect of continual overflow.

Collars and down-spouts would probably have to be constructed of light gage stainless steel to avoid creating another maintenance problem. Whether their cost would be justifiable in your case would have to be calculated from cost of frequent repainting now required.

**Q.—Do you have instructions for making French fried popcorn?**

**A.—Half-fill a steam-jacketed kettle with coconut oil (76 deg. melting point). After heating to 380F., introduce corn in a sieve so that it is submerged in hot oil. When corn stops popping, withdraw sieve, and dump popped corn on metal-topped table. Add salt, and separate unpopped corn. Then package into moisture-proof, heat-sealable bags.**

## Making Indian Candy

*Question—Do you have directions for manufacturing a popular confection known as Rasgola Juicy Balls, which are sold in eastern parts of India?*

Answer—Coagulate well-boiled fresh whole milk with sour whey. Collect coagulum by screening it through clean linen and draining free from liquid for about 30 min. Knead coagulum, and form into balls with granulated sugar (4-mm. crystals). Add balls to boiling syrup (43 Brix) and heat to about 102C. until they sink in syrup. Then slowly cool.

Coagulating milk to a pH of 5.2-5.5 with day-old whey gives a coagulum of desired elasticity. The

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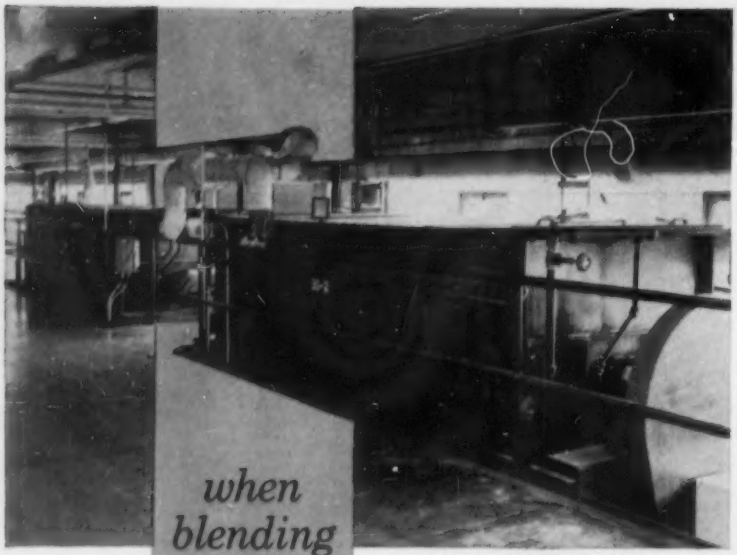

**DAY JUMBO MIXERS . . .** meet every requirement for maintaining a thorough blend of chocolate products under sanitary conditions at The Nestlé Company, Inc., Fulton, N. Y. For instance: seals may be furnished of sanitary construction requiring no packing, and of such simple design as to permit thorough cleaning in a matter of minutes between batches—(no more black specks working into product from stuffing boxes).

Outboard bearings on all models allow plenty of room for normal cleaning and maintenance. Special agitators available for blending high shortening content products. Heating or cooling jackets, dust covers and many other optional features available. For complete information write for Bulletin 800.

FOUNDED 1887

*in mixing equipment* **DAY** *means longer life span*

**THE J. H. DAY COMPANY**

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Division of Cleveland Automatic Machine Company

*Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products.*

**Mexico:** T. de la Pena e Hijos, S.A., Nazas 45-A, Mexico 5—D.F.

pH of 25 ml. of whey is adjusted from 3.8-4.3 to 6.0 with 12 to 15 ml. of 0.1N NaOH.

Sudden rise in temperature of the casein balls in boiling syrup imparts desired porous structure. Moreover, syrup boiling swells them 1½-2 times their original volume—important in making a quality product. Slow cooling, too, is essential to retain the expanded size of the rasgolas.—*J. K. P. Agarwal, Indian Institute of Sugar Technology, Kaupur, India.*

## Restoring Floors

*Question—We have one processing department in our plant in which the existing concrete floor is badly eroded and pitted. This department operates almost every day, and it is very difficult to find time to do any repair or replacement work. To make matters worse, there is a considerable amount of equipment installed in this area.*

*We have tried various kinds of quick-setting patching materials, but have not found them entirely satisfactory. We believe that a brick-tile floor would be ideal for this area, but its cost is high. More important, we simply have not been able to shut down production long enough to move out all equipment, install the graded sub-floor, and properly lay the tile. Could you suggest some quicker method of restoring this floor?*

Answer—Have you considered applying one of the new synthetic resin-type surfacing materials? Some of them are being used in food-processing plants where moisture, corrosive brines, and acids cause rapid deterioration of concrete floors.

These materials can be trowel-applied to a thickness of ¼-¼ in. Thus, their application is rapid compared with installation of brick tile. Further, it should not be necessary to move all the equipment out of the department, but only to raise it sufficiently to apply the coating underneath.

Another advantage is that the very slight increase in floor elevation precludes need for any entrance or exit ramps, such as are so frequently required where tile is installed on top of an existing floor. This saves space as well as installation expense.

One very important thing to bear in mind in use of such a surfacing material is that the manufacturer's instructions for preparing the existing floor for surfacing must be scrupulously followed. Resistant to

chemical attack as these resin finishes are, they simply cannot be expected to stand up unless they are properly bonded to the existing floor. Adequacy of the bond depends upon the preparation before application.

You probably will find that the total cost of such floor repair is not too different from one using brick tile, providing a substantial area is involved. However, speed of installation and the fact that equipment need not be moved out are big points in its favor.

For food-plant application, you probably will find the flooring manufacturer willing to guarantee the material for five years. And this is often sufficient in view of probable future changes in layout. The material many wear much longer, but there is not yet sufficient experience to prove it.

## Tallow Color Query

*Question—We read colors of tallow in our laboratory with standard FAC (Fat Analysis Committee of American Oil Chemists Society) tubes. Sometimes filter paper will not remove hazy-like, finely suspended matter.*

*Only expedient is to let the tallow stand overnight in a warm oven. Then a sediment forms, and tallow clears up enough to make a color reading. A centrifuge doesn't help much. Can you suggest a rapid way to produce a clear tallow (without bleaching it) so as to facilitate reading of color?*

Answer—Seems like your plant is employing a dry rendering system. As a result, suspended colloidal proteins are "throwing" your colors high when you test-read them.

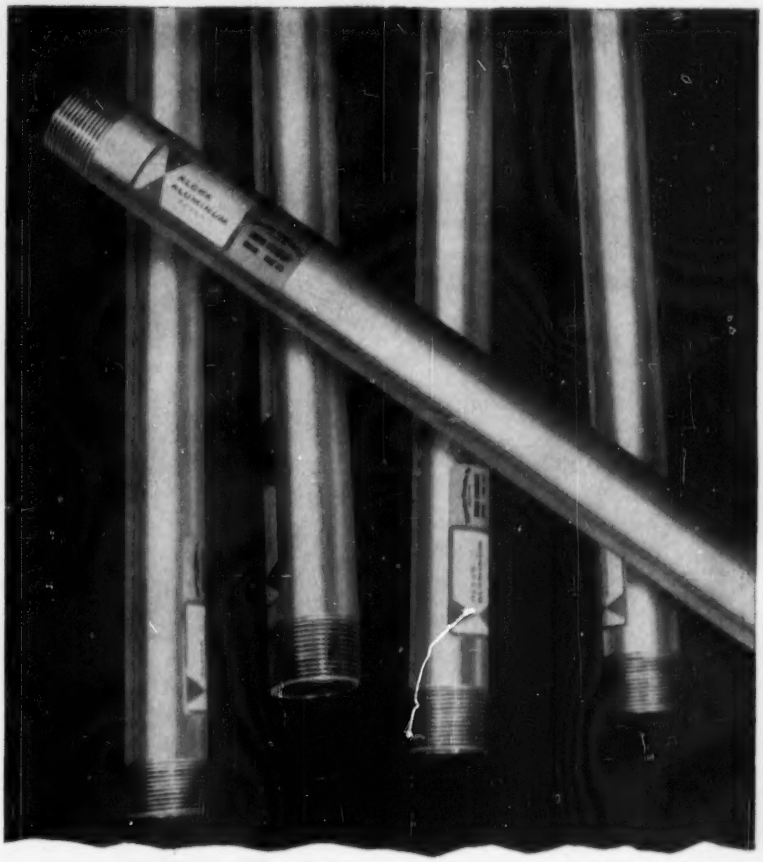
A good way to get a crystal-clear tallow is to add disatomaceous earth (½ to 1%) and run the sample through filter paper.

## Noisy Vacuum Pump

*Question—Our rotary-type vacuum pump, which is used in a key operation, has been making too much noise. Can you advise us of cause and remedy?*

Answer—A vacuum-pump system can, to the best of our knowledge, be noisy for three reasons. Either the pump knocks, the exhaust line pounds, or the exhaust valve slaps.

Foreign matter or damage to moving parts make a pump knock. Solu-

# FIVE WAYS BETTER

**ELECTRICAL RIGID CONDUIT, made by Alcoa, is better in five important ways . . .**

**1.** Aluminum rigid conduit resists corrosion. It resists all kinds of attack, even in contaminated areas. Rarely needs painting, yet it outlasts all others . . . saves for the life of the installation.

**2.** It's nonsparking—you can safely use Alcoa® Aluminum Conduit in hazardous locations. And it bears the Underwriters' Laboratory approval.

**3.** It's nonmagnetic. This means less voltage drop. You can run longer lines or use smaller wires. You can separate conductors, regardless of load.

**4.** It weighs less. You save on installation, handling, storage, transportation.

**5.** It's good looking. The naturally bright finish of Alcoa Aluminum lasts . . . for there is no coating to peel or blister. You can use this conduit wherever good appearance is important.

Get the full story on Alcoa Aluminum Electrical Rigid Conduit from any Alcoa sales office. Or write Aluminum Company of America, 2328-M Alcoa Bldg., Pittsburgh 19, Pa.

*Your Guide to the Best in Aluminum Value*

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS




For more data, circle this page number on card at back →

*New... and in stock!*

**Ampco Centrifugal Pumps in 316 Stainless**

*Hydraulic range includes capacities to 600 gpm., heads to 160 feet.*

*Pedestal assemblies available for base-mounted coupling connections.*

*Close-coupled connections fit NEMA standard pump motors.*

**New, high-speed pumps for handling clear liquids and fine slurries not corrosive to GR. 316 SS.**

**Although stock items, these pumps include features which, until now, have been available only on special order for custom-built models:**

1. ***Correct-design closed impellers*** **— for greater efficiency, longer life.**
2. ***Wear rings*** **— to save the casing, prevent expensive repairs, reduce down-time.**
3. ***Shaft sleeves*** **— to give greater operating economy, eliminate worn shafts, cut maintenance costs.**

**Ask your Ampco Pump Distributor to show you how these off-the-shelf pumps are easily adapted to the particular requirements of your specific application. Write for his name — and Bulletin P-3C.**

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Dept. FE-12, Milwaukee 46, Wis. • West Coast Plant: Burbank, Calif.

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**THE METAL WITHOUT AN EQUAL**

AMPCO — ONE-SOURCE SERVICE FROM RAW MATERIAL TO FINISHED PRODUCT

FE-23


tion is to disassemble and clean or replace broken parts. A pounding exhaust line is attributed to an obstruction that requires merely cleaning out the line and checking its discharge end for debris.

There's nothing wrong with a slapping exhaust valve, since slap is normal at high vacuum.

—*End*—

## Getting Special Machines

—*Continued from page 84*

way, the company arrives at the final design.

After construction, the machine is very carefully tested out before being released for service in plant operation.

### Usually Solved Before Step 3

As for the four-phase approach, the company generally finds the solution before reaching Procedure 3. This reflects the considerable effort made to solve the problems in the initial steps.

Frequently, it's advisable to acquaint the machine maker with pertinent data showing the desirability of altering his equipment. This technique helps assure the maker that the company knows what it is talking about.

Of course, machinery makers tend to be more receptive to improvements that minimize their development problems.

It is only when it is forced to do so that the company employs outside design firms, or itself designs the machines. It often takes considerable effort to find outside designers with the proper background. Also, since the company has a machine-development staff of its own, it would seem more natural to assign people on its own payroll to solve such special problems.

But here GFC recognizes the likelihood of specific weaknesses, so it places more emphasis on the use of outside talent, since this, in effect, broadens the "know-how."

There is one exception: When an attempt to find a specific machine consumes much more time than the organization's merchandising people feel they can tolerate (due to competition, or otherwise), then the company will "barrel ahead" on the particular development job simply to meet the deadline. But resorting to this procedure is not considered ideal.

*End* (*Resume reading on page 86*)

# USEFUL NEW BOOKS & GOVERNMENT PUBLICATIONS

## Processing Food Fats

MARGARINE AND OTHER FOOD FATS *By M. K. Schwitzer. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York City 1. 1956. 385 pages. 5¾ x 8¼ in., cloth. Price: $7.*

This British-printed volume offers a complete and comprehensive reference to not only margarine but cooking and baking fats, shortening, ghee, and other manufactured fats.

The author deals with all aspects of processing from raw material to distribution. Information is included on the nutritional value, and legal aspects of food fat labeling and sale.

Illustrated with numerous charts and flow diagrams, it is written primarily for the chemist or technologist. The clear style and simple presentation, however, make it palatable for those with less technical background.

## Twelve on Food Radiation

Released for the first time to industry by the Office of Technical Services, U. S. Department of Commerce, are twelve research reports on the radiation sterilization of foods. The reports detail research carried out for the Quartermaster Food and Container Institute for the Armed Forces. Reports are listed below, they may be ordered by PB number from the Office of Technical Services, Washington 25, D. C. at prices indicated.

CHEMICAL CHANGES IN PROTEIN OF STERILIZED MEAT *Iowa Agricultural Experiment Station, Iowa State College of Agriculture and Mechanical Arts. 22 pages. Price: 75¢. (PB 121-300).*

RADIATION SENSITIVITY OF MEAT SPOILAGE MICROORGANISMS *American Meat Institute Foundation. 19 pages. Price: 50¢ (PB 121301).*

FLAVOR OF FOODS STERILIZED BY COMBINING CONVENTIONAL PROCESSING WITH IONIZING RADIATIONS *Oregon Agricultural Experiment Station, Oregon State College. 52 pages. Price: $1.50. (PB 121302).*

FUNDAMENTAL PHYSICAL AND BIOCHEMICAL CHANGES WHICH OCCUR AS A RESULT OF RADIATION TREATMENT RESULTING IN MODIFICATIONS OF FLAVOR, COLOR AND TEXTURE *Massachusetts Institute of Technology. 77 pages. Price $2.00. (PB 121303).*

CHANGES PRODUCED IN LIPID MATERIALS BY HIGH ENERGY RADIATIONS *University of Minnesota, Hormel Institute. 29 pages. Price: 75¢. (PB 121304).*

DEVELOPMENT OF A METHOD OF RADIATION STERILIZATION OF FOODS WITHOUT ADVERSE FLAVOR AND CHEMICAL CHANGES *Massachusetts Institute of Technology. 109 pages. Price: $2.75. (PB 121305).*

INHIBITION OF ENZYMATIC ACTIVITY IN IRRADIATED FOOD STUFFS *University of Wisconsin Institute for Enzyme Research. 26 pages. Price: 75¢. (PB 121306).*

RELATIONSHIP OF RADIATION INDUCED FAT OXIDATION AND FLAVOR, COLOR AND VITAMIN CHANGES IN MEAT *University of California. 7 pages. Price: 50¢. (PB 121307).*

COMBINED EFFECTS OF HEAT AND RADIATION IN FOOD STERILIZATION *Engineering Research Institute, University of Michigan. 48 pages. Price: $1.25. (PB 121308).*

CHEMISTRY OF COLOR, FLAVOR AND ODOR CHANGES IN A RADIATING MEAT *American Meat Institute Foundation. 16 pages. Price: 50¢. (PB 121309).*

CHEMICAL AND ORGANOLEPTIC CHANGES IN CARBOHYDRATES AND PROTEINS PRODUCED BY RADIATION STERILIZATION *Ohio State University Research Foundation. 79 pages. Price: $2.00. (PB 121310).*

EFFECT OF IONIZING RADIATIONS ON CAROTENOID STABILITY *University of California. 11 pages. Price: 50¢ (PB 121313).*

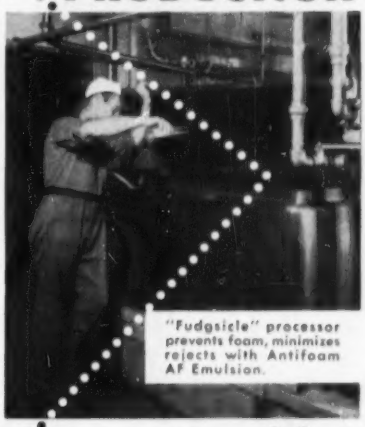
## Booklets & Reports

SCREW CONVEYORS *(PB 121324) Published by Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. 14 pages, paper. Price: 50¢. Guide to planning and construction of equipment.*

OPERATING RESULTS OF FOOD CHAINS IN 1955 *Published by Harvard Business School, Boston 63. 30 pages, paper. Price: $2.00. Study of margins, expenses, and profits of food chain companies.*

FROZEN FISH *Published by European Productivity Agency of Organization for European Economic Cooperation, Paris. 158 pages, paper. Price: $1.25. Tips on improving quality and packing to spur consumption.*


BOOST PRODUCTION

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**YOU KILL FOAM FAST,** increase productivity, stop wasteful and unsanitary boil-overs or spillage when you use a Dow Corning Silicone Defoamer. Physiologically harmless, water dilutable Antifoam AF Emulsion may be used in processing nonstandardized foods at concentrations up to 34 ppm; Antifoam A Compound up to 10 ppm.

Effective in remarkably low concentrations, Dow Corning Silicone Defoamers are the most versatile and economical foam killers ever developed for food processors.

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**In Chocolate Syrup**
1 oz Antifoam AF per 2075 lb.

**In Dill Pickling Solution**
1 oz Antifoam AF per 15,625 lb.

**In Vitamin B2**
1 oz Antifoam A per 35,000 lb.

**In Chewing Gum Base**
1 oz Antifoam A per 20,833 lb.

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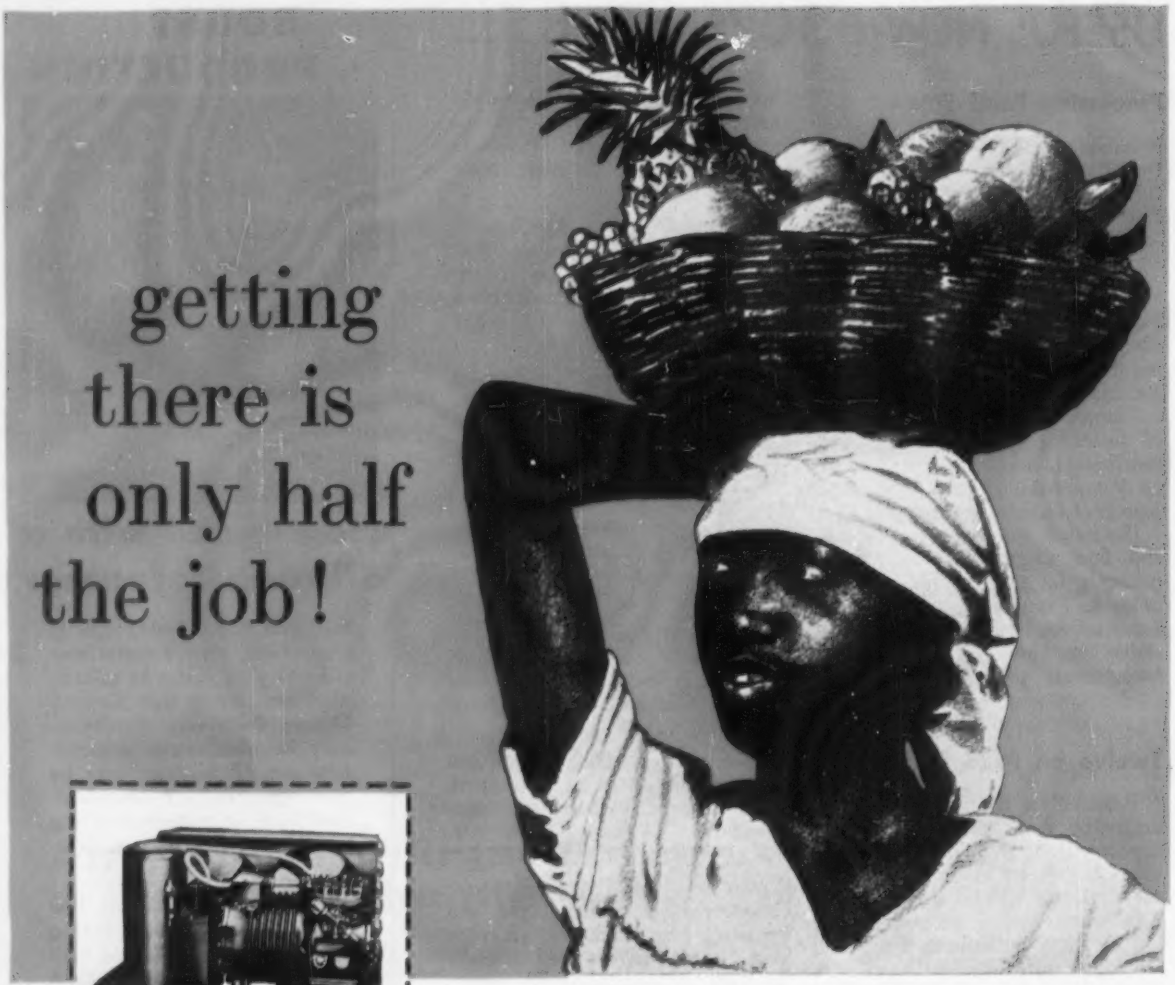
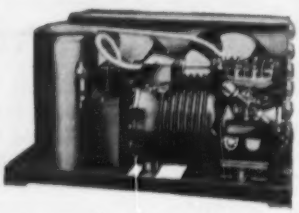
# getting there is only half the job!





**CAPACITY**

Choose from ⅓ to 3 H.P. in Copelametic, the direct-drive accessible hermetic, and economical belt-driven models. Model TR-100 shown.

**DEPENDABILITY**

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Antiquated methods of food delivery are giving way to refrigerated trucks all along the line . . . for retail, wholesale and house-to-house delivery of perishables. There's a practical reason: Freshness and profit go hand in hand. Now, fleet operators and food processors protect payloads with refrigerated trucks powered by time-proven Copeland units.

Whatever the application—holdover, or over-the-road—a Copeland unit protects valuable perishables. Plugged in at stops, or run from a generator for over-the-road use, a Copeland truck unit produces cooling you can count on all the way . . . at lowest cost per mile. Write for complete information on the Copeland compressor best for your needs.

SINCE 1918

**Copeland** REFRIGERATION CORPORATION, Sidney, Ohio

WRITE FOR SPECIFICATIONS AND PERFORMANCE DATA

# KEEPING UP WITH THE FIELD

TECHNICAL NEWS • WASHINGTON HIGHLIGHTS • ECONOMIC TRENDS • LABOR DEVELOPMENTS

**New Protection for Meats**

Broadening its packaging applications, The Cryovac Co. (Div. of W. R. Grace & Co., Cambridge, Mass.) now announces a new pre-bagging technique for institutional, boned beef cuts that is claimed to prevent moisture losses and molding, while permitting normal aging and boosting shelf life to two weeks. Bagged meat (foreground) is vacuumized and clip-sealed (center). Film is finally shrunk to a tight fit by hot water sprays (left rear).

## MIF Hails 1956 As Record Dairy Year, Plans 155-Billion-Lb. Output By '65

Optimism was the key word as dairymen gathered in Atlantic City for the 49th annual convention of the Milk Industry Foundation (MIF).

The theme was set by C. R. Brock, president of MIF, who declared that 1956 shows every sign of being a record year—not only in production, but in consumption and cash income.

Output will total 127-billion lb. total milk equivalent, he said, up 3½-billion lb from '55. At the same time, dairy farmers will receive $4.6-billion in cash income, a 10% jump over '55.

To boost consumption, there is a population increase of 2,800,000 people. This will account for about 2-billion lb. of the extra milk. And a projected 1¼% hike in consumption should more than cover the rest of the surplus.

For the future, president Brock hailed the increase in home consumption as a boost for dairymen. Whole milk sales in this area are up 4% over '54, skim milk purchases up 22%.

By 1965, he continued, population increase alone will demand 13-billion lb. more milk than will be produced this year. And a conservative, 11% increase in consumption of milk and dairy products will necessitate an annual production of 155-billion lb. of milk—28-billion lb. more than present supplies.

### Foresees Fortified Cereal

High quality proteins—comparable to those in milk, meat, and eggs—can now be built into bread and other cereal foods, declares du Pont scientist Dr. N. W. Flodin in *Cereal Science Today*.

It's done by fortifying the products with essential amino acids, such as lysine. Dr. Flodin cites studies which show that addition of lysine alone to wheat gluten raises its protein efficiency into the range of meat, milk, and eggs for both infants and adults.

### Frozens Hit New Peaks

Huge processing crops zoomed warehouse stocks of frozen fruits and vegetables to record levels on August 31, declares USDA.

Frozen vegetable holdings topped 714,000,000 lb.—up a sharp 18% over the same date in '55, and 33% higher than the 1951-55 average. Frozen fruits soared to 470,000,000 lb., largest figure ever recorded for the ¾-year mark.

### Boost for Poultry Export

A booming foreign market is being developed for U. S. poultry producers under the Trade Development and Assistance Act, declares the Institute of American Poultry Industries.

Currently, West German importers are buying 400 long tons of broilers, 400 tons of fowl, 100 tons of turkey, and 100 tons of ducks.

**Big Lab to Step Up Aseptic Canning Research**

On hand to "christen" U. of California's enlarged research center for aseptic canning are (l. to r.) H. R. Wellman, U. of C. vice president of agricultural sciences; R. C. Stolk, vice president, American Can Co.; and Dr. Emil Mrak, head of the food technology department. With the new equipment (Canco donated $10,000 worth), the installation is now capable of turning out research packs of thousands of cans annually in a stepped-up program for probing the problems of aseptic canning.

## Convenient Foods, Better Packaging Lure Extra DI From Consumers

Old sales theories are tumbling under the avalanche of modern convenience products, attractive packaging, and super market merchandising.

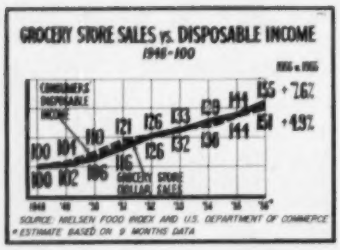
The "experts" have long ruled that the percentage of disposable income (DI) spent at the corner grocery is fixed. But new figures from A. C. Nielson Co. (see graph, right) show that dollar sales have zoomed 55% since 1948, while DI has risen only 51%. Further, estimates for '56 based on 9-mo. figures show a 7.6% boost in sales with only a 4.9% gain in disposable income.

This food spending—over and above what would normally be expected—is directly linked to convenience products by J. O. Peckham, Nielson executive vice-president. In a 4-yr. survey of 40 packaged food items made by the company, general sales increase is 21%. But product classifications containing items with major built-in conveniences are up 33%. And individual products in these groups have soared as high as 124%.

Other products containing new developments—such as additional types, flavors, and sizes—rose 30% in the 4-yr. period.

Thus, the key to increased sales, he continues, lies in giving increased value to the consumer in the form of conveniences, better packaging, additional types and flavors, and more usable sizes.

With present progress in mind, he concludes with a conservative prediction of a 5% rise in grocery sales for 1957.


GROCERY STORE SALES vs. DISPOSABLE INCOME
1948=100
CONSUMER'S DISPOSABLE INCOME
GROCERY STORE DOLLAR SALES
100 101 110 121 126 133 139 144 135 +7.6%
100 102 106 116 126 132 136 141 141 +4.9%
SOURCE: NIELSEN FOOD INDEX AND U.S. DEPARTMENT OF COMMERCE
* ESTIMATE BASED ON 9 MONTHS DATA

## Army Picks California For A-Ray Center

The U. S. Army's Ionization Radiation Center will be located at Sharpe General Depot in Stockton, Calif., according to a joint announcement by Secretary of Army W. M. Brucker and AEC Chairman L. L. Straus.

The new facility—which will pioneer pilot plant research in radiation sterilization of foods—is slated for completion late in 1958.

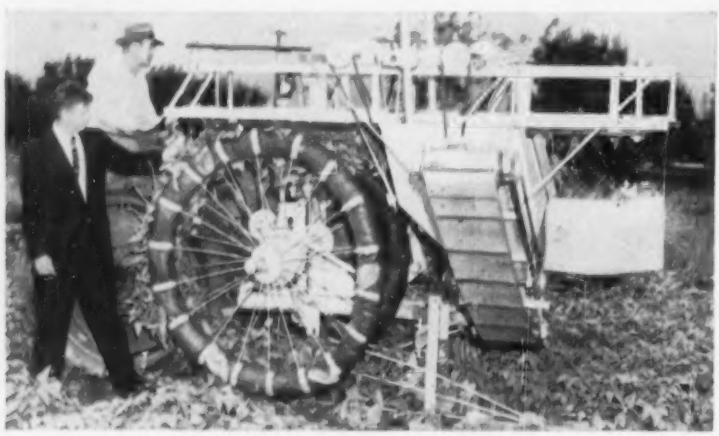
Reactor and related equipment, to be built by AEC, is expected to cost $3,000,000. It will be a water-moderated type with solid fuel elements, and a powerful source of intense gamma rays.

Other facilities at the center, including a high-energy particle accelerator, will cost $4,500,000.

## Pickle Packers Elect

Harry Tuttle, Minneapolis, was reelected president of the National Pickle Packers Assn. at the recent annual Pickle Fair in Chicago.

Also reelected was W. E. Dailey, Jr., Saginaw, vice-president. New treasurer is L. S. Glaser, Chicago.



**New Idea for Harvesting Limas**

A long-awaited harvester for lima beans is a step nearer to reality with development of this experimental field rig by Magnuson Engineers, Inc., San Jose. Machine cuts the vines below ground level. Rubber wheels pick vines up and deposit them in flailing section (behind conveyor, right). Vine skeleton is returned to field. Pods pass through a blower to separate leaves and are finally loaded on an accompanying truck.

## Reveals Freezing Defect

Low holding temperatures appear to be as vital for bakery products as for other frozens, according to results of a research study by USDA'S WURB, Albany, Calif., on "white ring" in frozen bread.

The defect, which appears as a dehydrated ring on the slice within the loaf, occurs within two weeks when loaves are stored at 15-20F. It takes' ten weeks to appear at 0-10F. storage.

A study of ingredients and rate of freezing and defrosting showed that these factors have no effect on the condition.

## Sees Sharp Gain for Frozens

Forecast of a 300% growth in frozen food sales within the next 10 years comes from Nathan Cummings, Chairman of the Board, Consolid. ted Foods Corp.

Pointing out that 25,000,000 out of 43,000,000 U. S. families now regularly buy frozen items, he declares that the present 5% of grocery sales represented by frozens will zoom to 20% by 1966. This should boost sales to over $7 billion.

## Food Science Scholarship

For the fifth straight year, John H. Dulany & Son, Inc., Maryland food processor, has appropriated $2,000 for an undergraduate scholarship in food processing.

The award, to be spread over four years of training, is at the U. of Maryland.

## USSR Pushes Progress On Factory Trawlers

The Russian fishing fleet appears to be making rapid progress in development of fish-and-freeze trawlers for processing fillets at sea, according to Fish & Wildlife Service.

F & W S notes that operation of a new Russian factory ship is detailed in *Fiskets Gang*, a Norwegian fishing periodical.

The new vessel can freeze up to 600 metric tons of fillets during a 60 to 70 day cruise, without putting into port. Processing operations are fully mechanized.

This news coincides with another F & W S report that England is building 20, diesel-powered trawlers, fully equipped with canning plants and freezing facilities, for the USSR.

## HORS D'OEUVRES

**▶ In 1927, Daniel Gerber's wife asked him to strain peas for their baby daughter in his cannery. In its past fiscal year, Gerber Products Co. sold nearly $100 million worth of baby foods. Makes one wonder what his own wife may have suggested when he wasn't listening.**

▶ Model missiles traveling 10,000 mph. are "gently" stopped by a cushion filled with flour and instant shaving cream. Just the thing for New York pedestrians.

**▶ Someone should develop a self-rising breakfast-in-bed food for late-rising commuters.**

▶ Consumption of home-cooked potatoes has been dropping. And the sale of chips increased from 2.83 to 3.37 lb. per capita last year. Shows what food processing can do in this you-cook-it, we'll-eat-it age.

**▶ The U. S. spent better than $1 billion in three years to sell surplus foods abroad. About 10% of the deals were "triangular." That is, we bought industrial products from the countries that bought the food, then gave those products to the poorer nations. See, kids, there is a Santa Claus.**

▶ In 1602 an Englishman planted the first oats in America. And a lot of his countrymen have sowed wild oats here since.

**▶ Crop-damaging eelworms have been killed with the fungi Phycomycetes and Hyphomycetes in British experiments. These fungi snare the worms in their own body cells and devour them. That's the kind of biological warfare we can appreciate.**

▶ Progress is being made in electro-lumenescence – making phosphor-coated glass glow by applying electrical energy.– Just the thing for glass-packing electric eels.

*Trona is the trade mark of American Potash and Chemical Corporation.

9 REASONS WHY TRONA* USES STANDARD DRYERS

1 HIGHEST PRODUCTION AT LOWEST COST 2 EASY FINGERTIP CONTROL 3 METAL TO METAL SEALS
4 COMPLETE CHOICE OF MATERIALS 5 RUGGED RUNNING GEAR 6 MODERN SMOOTH DRIVES
7 ANTI-FRICTION BEARINGS 8 DESIGNED TO DO THE JOB 9 UNCOMPROMISED PRECISION

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Ton-Tex Pur-O-Tex is a white, non-toxic conveyor belt built for food processors and canners. Resists oil, heat and water. Does not impart odor or taste to unpackaged food products conveyed. Pur-O-Tex can be washed and kept clean. Has minimum stretch or shrinkage, runs true and lasts longer. Pur-O-Tex speeds production and cuts costs.

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STANDARD for food products, cans, bottles and light, non-abrasive containers and materials.

WHITE CONVEYOR for handling fruits, vegetables and food products free from oils.

CLAW TOP resists abrasion, moisture. Conveys packages, cartons, etc. up or down inclines.

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• Through its leadership in fermentation chemistry, Pfizer now offers pharmaceutical and food manufacturers the essential nutrient L-lysine in practical commercial quantities. A unique fermentation process assures that only the biologically active L-isomer is produced.

In the average human diet lysine is more deficient than any of the other eight essential amino acids.

Volume production of Pfizer L-lysine means you can offer an important new health plus in your products. In medicinal products Pfizer L-lysine should have special significance in meeting the nutritional needs of children, pregnant women, older people and those who are recovering from illness. In cereal food products, particularly wheat products,* Pfizer L-lysine can improve the amino acid balance to a level comparable to that of high quality animal proteins.

Write us if you would like further information about Pfizer L-lysine, and a free sample. Pfizer Technical Service men can also help you in taking advantage of this important new development.

*Before adding L-lysine to food products, manufacturers should check Federal and State standards of identity.

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## Better Packages Lead Surge In Beverage Bottling

Packaging is the spark responsible for the present boom in soft drinks, wines, and beer, according to a survey conducted by the Folding Paper Box Assn. of America.

Prior to World War II, most beverages were unpackaged, states the report. And 75% of all beer and wine was consumed away from home.

Today, 66% of soft drinks are consumed in the home, and during the first six months of '56, 78% of all beer sold was packaged (34% in cans) to catch the eye of the carry-home shopper.

Major credit for increased consumption goes to new packages and carry-home cartons, declares the Association. By broadening distribution and offering added consumer convenience, these improvements have boosted per capita consumption of soft drinks from 37 bottles in 1935 to a high of 184.2 bottles today.

While consumption in general has dropped for beer, sales through supermarkets due to the six-pack cartons have jumped from 7% of consuming families in '49 to 17% in '55.

American-made wines have shown spectacular growth—from 63,000,000 gal. in 1941 to 140,000,000 gal. in '55. One of the most promising merchandising efforts in this climb has been the carry carton, containing an assortment of wine varieties in a single package.

### Tests for Tenderer Meats

A projected 3-year study of the factors influencing meat tenderness has been launched by American Meat Institute Foundation, Chicago.

The ambitious research program—sponsored jointly by Huron Milling Co., Harbor Beach, Mich., and Paul Lewis Laboratories, Milwaukee—seeks to discover the exact influence that various tenderizing substances exert on meat cuts. Physical tests of muscle fibers will be used to establish empirical ratings for the various types of treatment.

### Record GNP for 1956

A record gross national product (GNP) of $414-billion has been predicted for 1956 by the U. S. Department of Commerce. The estimate is based on third-quarter figures, which show a boost of $17-billion over the same nine-month period in 1955.

The giant forecast—almost double the GNP in 1946—would mean a $12-billion gain over last year. And it would lend increased weight to President Eisenhower's prediction of a $500-billion national output by 1966.

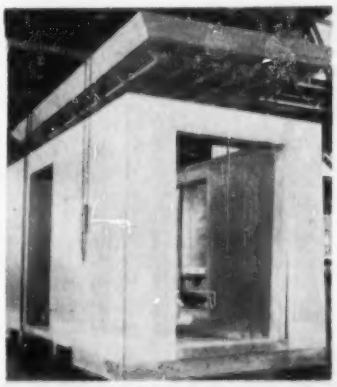
### Brewers Change Malt Test

Revised method for determining diastatic value in malt has been adopted by the American Society of Brewing Chemists. The technique is stated to give a truer value for diastatic power under brewery mash conditions.

New test differs from the old one only in substitution of 0.5% sodium chloride for distilled water when preparing malt infusion and dilution. Result, however, is said to increase calculated diastatic power by 5%.

**Public Health Researchers Win Methods Award**

Discovery of better methods for detecting food poisoning, typhoid, and other disease bacteria has won the 1956 Kimble Methodology Research Award, sponsored by Kimble Glass Co., for two public health scientists. Recipients are Drs. W. H. Ewing (left) and P. R. Edwards (center) of the Public Health Service, Atlanta. Dr. E. Schaffer, Chairman of Awards Committee, presented the plaque and a $1,000 prize.



**Devises New Meat Shipper**

Latest entrant in the "piggy back" race is this refrigerated box used by the Rock Island Lines, and termed "Convert-A-Frate." Shown here in construction, carrier is whisked from flat-bed trucks to rail carriers by fork trucks. It carries 14,000 lb. of meat, hung from the ceiling rack. A thermo-controlled dry-ice circulating system provides cooling. Box panels are composed of balsa wood cores and plastic skins (Minnesota Mining & Mfg. Co.).

### Advanced Food Courses

Rapid progress in packaging, and the application of chemistry, physics, and engineering to food technology has lead two universities to establish new night courses for graduates.

At Illinois Institute of Technology: A graduate seminar in food packaging meets weekly with a prominent packaging executive for discussion.

At U. of California: A post professional program, taught by department professors, brings graduates up to date on food industry advances.

**Rubber Leaves for Filter**

Special man-made rubber is molded into leaves for a new filter that's finding wide use in the food industry. The rubber (Hycar, B. F. Goodrich Co.) has high resistance to oil, grease, chemicals, abrasion, and temperature. The filter, particularly useful in parallel installations, is made by Industrial Filter & Pump Mfg. Company.

## Forms New A-Ray Facility

Ten large companies, representing various industries, have combined to build and operate a new nuclear research reactor, to be located at Plainsboro, N. J. and called Industrial Reactor Laboratories, Inc.

Continental Can Co. and Corning Glass Works, two members of the group, announce their intention to use the facility for further probing the effects of food radiation.

## Faster Repair for RR Cars

The skyrocketing demand for freight cars poses a strain on processors, particularly when these carriers have to be removed from service to repair cracked, splintered, and broken interiors. But the situation is now relieved through a fast new method that cuts the maintenance job from days to hours, according to Archer-Daniels-Midland Co.

Technique involves covering the damaged area with glass cloth, held in place with a sprayed-on plastic.

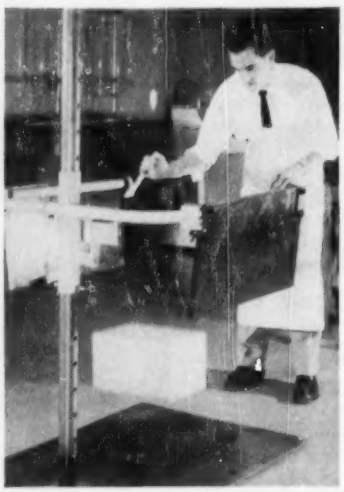
## Dairy-Course Roundup

Short courses and dairy conferences are slated at the following universities and colleges during the coming months.

Michigan State U.—Short courses in: Market Milk, Jan. 7-18; Laboratory Methods, Jan. 21-Feb. 1; Ice Cream, Feb. 4-15; Cottage Cheese & Fermented Milks, Feb. 18-Mar. 1; Dairy Eng. Conference, Feb. 26-27; Penn. State U.—Dairy Products Testing Short Course, Jan. 7-12; Plant Men's Ice Cream Course, Jan. 14-26.

Rutgers U.—Ice Cream Short Course, Jan. 7-17, Conference, Jan. 18; Milk Testing Course, Jan. 21-24, Market Milk & Fieldman's Conference, Jan. 25; U. of Maryland—Ice Cream Short Course, Jan. 21-30, Conference Jan. 31; U. of Georgia—Joint Ice Cream & Food Handlers Conference, Feb. 18-21; Texas A & M—Dairy Industry Conference, March 14-15; U. of Illinois—Conference on Dairy Plant Automation, Mar. 26-28.

Purdue U.—Three-day programs on bottled milk and cream, Jan. 8-10; cottage cheese, Jan. 29-31; and frozen dairy products, Feb. 19-21.



**New Lab Probes Flexibles**

"Drop tester" gages life expectancy of shipping cases, and the flexible-film-bagged products inside the box, at du Pont's new film packaging lab in Montreal, Canada. Here intense research is likewise being aimed at moisture transmission and heat sealing problems in cellophane, polyethylene, and Mylar.

## Correction

My article, "Large-Fish Dressing Automated by New Russian Machine" (FE, Oct. '56, p. 53), describes fish-butchering equipment being built and used in the U.S.S.R.

But my attention is called to the fact that the design of this Russian machine is basically the same as that of a similar machine originally developed and patented by the Smith Cannery Machines Co., Seattle, Wash.—David N. Lewin

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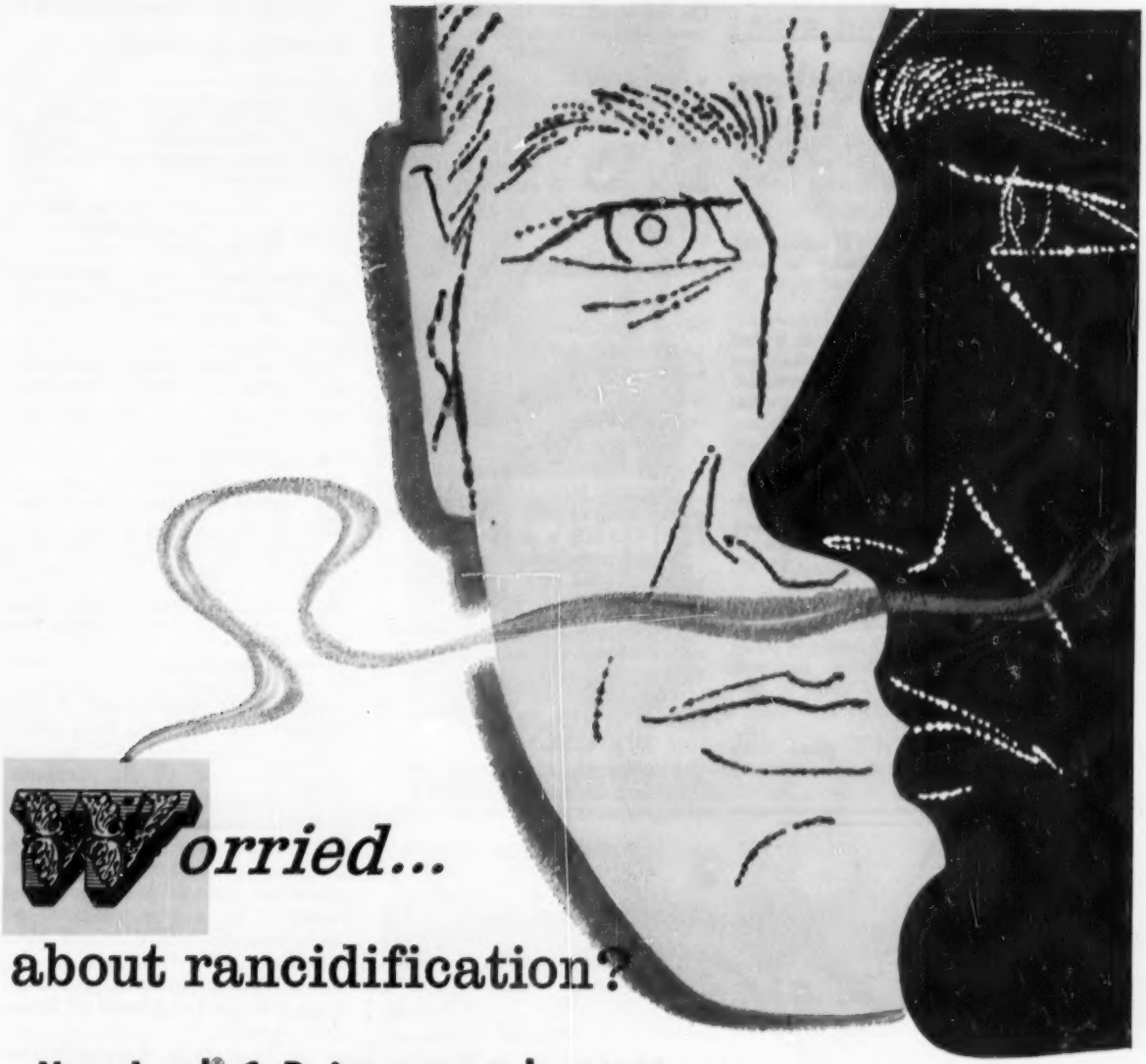

# Worried... about rancidification?

## New Ionol® C. P.-impregnated cartons and wrappers protect flavor and aroma . . . *prolong shelf life*

YOU KNOW WHAT a serious, ever-present threat to shelf life rancidification is. Here's a new, simple, yet extremely effective way to combat it—Ionol,C.P. antioxidant.

Rancidity usually begins with fats and oils that have migrated to the surface of packaging materials. But, when boxboard and paper are impregnated with Ionol,C.P. antioxidant, they give dependable protection to aroma and flavor by effectively preventing oxygen attack on fats.

In actual tests, baked goods were stored at 85°F in Ionol,C.P.-impregnated boxboard cartons, which were found to be free of rancidity at the end of ninety days. Without Ionol,C.P. protection, packages of baked goods stored under similar conditions often develop rancidity within a week.

You can insure long shelf life and protection of your brand label's good name by asking for packaging materials containing Ionol,C.P. antioxidant. Write to Shell Chemical for names of suppliers of new Ionol,C.P.-impregnated packaging.

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# BRIEFLY

• WATERED MILK can now be accurately determined with the aid of an electrical tester, declares the inventor, Dr. C. K. Hancock, Texas Engineering Experiment Station. The method involves measurement of indirect conductivity in moisture-laden materials.

• **TURKEY ranks highest in protein and lowest in fat of any poultry or meat tested, according to a recent report by Cornell U.**

• PLASTIC PACKAGING is undergoing a new series of tests by Southern Research Institute to gage its protective qualities for foods subjected to irradiation with gamma rays. Project is sponsored by Quartermaster Food & Container Institute.

• **COAL TAR DYES are under attack again as FDA reveals that four more of the controversial colors have been found toxic. The specific dyes are FD&C Yellow Nos. 1, 2, 3, and 4.**

• ENGINEERING SCHOLARSHIP that recognizes accomplishment of young workers in college research has been established in memory of Curtis W. McGraw by the McGraw-Hill Book Co.

• **MUSHROOMS will be grown under strict scientific control by Campbell Soup Co. at a new $2,000,000 farm now under construction at Gazos Creek, Calif.**

• FREEZE-PEELING machine (FE Oct., p. 58), which employs an Italian-developed enzyme technique for skinning tomatoes is now being distributed in America by E. A. and C. H. Tosi, Boston, and R. A. Tosi, San Francisco.

## Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and the Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

*Pineapple juice*, canned, AMS proposed revision of U. S. Standards, *F. R.*, Oct. 19. p. 8059.

*Sauerkraut, canned*, AMS proposed revision of U. S. Standards, *F. R.*, Oct. 24, p. 8144.

*Prunes, dried*, AMS establishment of U. S. Standards, *F. R.* Oct. 25, p. 8177.

*Tomatoes, fresh*, AMS proposed revision of U. S. Standards, *F. R.*, Oct. 30, p. 8287.

*Blackberries and similar berries, canned*, AMS establishment of U. S. Standards, *F. R.*, Oct. 31, p. 8309.

*Lima beans, frozen*, AMS proposed amendment of U. S. Standards, *F. R.*, Nov. 10, p. 8777.

*Figs, canned*, Standards of Identity for FDA *F. R.*, Oct. 17, p. 7925.

*Orange juice, fresh orange juice, stabilized orange juice, processed orange juice, and reconstituted orange juice*, FDA Standards of Identity, *F. R.*, Nov. 6, p. 8511.

*On shelled corn and grain sorghum*, tolerances of mineral oil, *F. R.*, Nov. 6, p. 8512.

*On sugar beets*, proposed tolerances of sodium 2, 2-dichloropropionate, *F. R.*, Oct. 20, p. 8089.

*On copra*, proposed exemption from tolerance of ethylene oxide, *F. R.*, Oct. 20, p. 8089.

*On apples, cabbage, cherries, and pears*, withdrawal of petition for tolerances of Diazinon, *F. R.*, Oct. 20, p. 8089.

*On uncooked poultry*, tolerances of Oxytetracycline, *F. R.* Oct. 23, p. 8104.

*On cabbage, broccoli, brussels sprouts, cauliflower, and kohlrabi*, proposed tolerances of diethyl diphenyl dichloroethane, *F. R.*, Oct. 17, p. 7957.

*On whole spices*, proposed tolerances of ethylene oxide, *F. R.*, Nov. 14, p. 8820.

*On asparagus*, proposed tolerances of Monuron, *F. R.*, Nov. 14, p. 8821.

*Ricotta cheese and part-skim ricotta cheese*, FDA Standards of Identity *F. R.*, Nov. 6, p. 8492.

## Schedule of Events

January '57

6–10—National Assn. of Frozen Food Packers and National Frozen Food Distributors Assn., joint annual convention; Fountainebleu Hotel, Miami Beach, Fla.

20–24—National Potato Chip Institute, annual conference; Statler-Hilton Hotel, Dallas, Tex.

21–24—National Macaroni Manufacturers Assn., annual meeting; Flamingo Hotel, Miami Beach, Fla.

23–25—Southeastern Symposium on Industrial Instrumentation, annual conference; U. of Florida, Gainesville.

28–30—Canadian Food Processors Assn., annual convention; Seigniory Club, Montebello, P.Q.

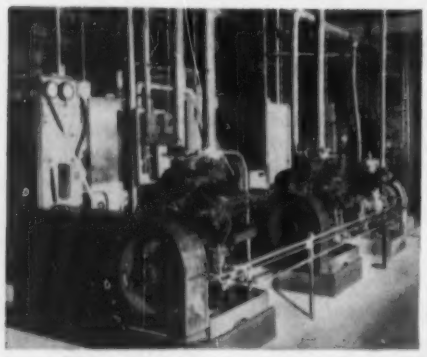
28–31—Plant Maintenance & Engineering Show; Public Auditorium, Cleveland.

31–F1—National Wooden Box Assn., annual meeting; Boca Raton Hotel, Boca Raton, Fla.

30–F2—American Dehydrators Assn.; Edgewater Gulf Hotel, Edgewater Park, Miss.

**Famous Puffin Biscuits Made and Kept Fresh With Frick Refrigeration**

**The new million-dollar plant of Ready-to-Bake Foods Inc., at Charlotte, N.C., cools its entire output of Puffin Biscuits with three "ECLIPSE" refrigerating machines. Storage temperatures are in the low 30's. A fourth Frick compressor cools the jackets of the dough mixers. Installation by Piedmont Engineering Corp., Frick Distributors at Charlotte.**



*Four Frick Refrigerating Machines, with full-automatic controls, in service at Ready-to-Bake Foods Inc., Charlotte, N.C.*

**Just how refrigeration is applied to widely varying industries in the Carolinas is explained in a recent Frick publication. Write for your copy.**

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## Future of Antibiotic Agents

—Continued from page 56

R. J. Shirk of Cyanamid's Lederle Laboratories, Pearl River, N. Y., elaborated on degradation products formed when chlortetracycline-treated poultry is cooked.

A broth made by boiling antibiotic-treated poultry yielded crystals of isochlortetracycline, which were conclusively identified by infrared and ultraviolet absorption spectra. This material was also shown to be a normal degradation product of chlortetracycline when administered to animals.

### 2—Ham, Sausage, Beef Preserved

Spoilage of ground sausage and cured-smoked ham may be markedly retarded by use of trace amounts of oxytetracycline, stated Z. J. Ordal, Dept. of Food Technology, U. of Illinois, Urbana.

In test with ground, fresh lean pork, combinations of antibiotic (5-45 ppm.) and salt (3-5%) were more effective in delaying spoilage than either agent alone. Additive effect of oxtetracycline was most pronounced when the concentration of salt was low.

To evaluate preservative action of this antibiotic in pickle solutions used for curing of hams, nitrate and sugar elements were held constant, while oxytetracycline and salt levels were varied. Hams cured in a 4% brine with no added antibiotic spoiled after 5 days storage at 85F. In contrast, when 15 and 45 ppm. of oxytetracycline, respectively, were added to similar brines, spoilage was delayed for 9 and 23 days, respectively.

A team of researchers from Ohio State U. pinpointed reasons for effectiveness of chlortetracycline in preserving the freshness of beef.

Tests reported by J. M. Jay, Ohio Agricultural Experiment Station, Columbus, answered the questions of whether such treatment of beef carcasses changed the bacteria, and whether resistant strains developed in the presence of the particular antibiotic.

Results with 14 long cuts of beef rounds, 9 of which were treated with chlortetracycline, showed:

A. No alterations in the kinds of bacteria in the presence of the antibiotic.

B. No evidence that strains of bacteria, previously established as sensitive to the antibiotic, have become resistant to it. This is because these bacteria are exposed to very low antibiotic concentrations, and then only once.

C. Consistently fewer spoilage bacteria on treated beef.

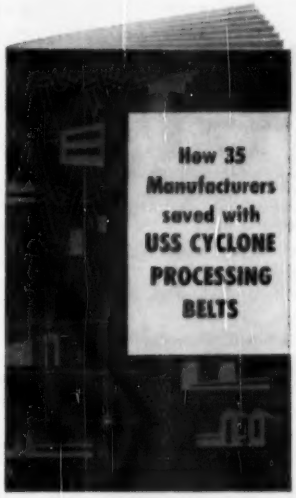
Another technique for extending freshness of refrigerated, prepackaged red meats was described by C. F. Niven Jr., American Meat Institute Foundation, Chicago.

He told of combining the preservative effects of gamma irradiation and a 10-ppm. solution of oxytetracycline, the latter being used to control a range of bacteria not affected by radiations. In some cases, he said, microbial spoilage no longer determines the shelf-life of meats thus treated.

However, changes of non-bacterial orgin (color changes, dehydration, and drip loss) then come into pominence in determining the effective life of displayed, prepackaged fresh meats. Also, occasional difficulties are caused by yeasts which are relatively resistant to both antibiotics and radiation.

### 3—Ups Fish Storage-Life

Potential applications of antibiotics in extending the freshness of fish were reported by J. A. Stern, School of Fisheries, U. of Washington, Seattle.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Use of oxytetracycline not only prolongs the overall storage life of salmon, but extends the period in which it is judged as good. Maximum preservation is obtained when fish are stored in 32F. brine. Here this antibiotic increases by 3 days the storage period in which fish are rated "good," and the overall storage life by 9 days.

Another phase of this investigation showed that storage life could also be extended by spraying salmon with antibiotic solution when they are received aboard a tender. And similar results were found in tests with English sole.

In comparative studies of the effectiveness of various antibiotics as fish preservatives, the following was found:

A. Solutions of tetracycline are less effective than equimolar solutions of oxytetracycline or chlortetacycline.

B. In preserving English sole, data indicate that oxytetracycline solutions are more effective than solutions of either chlortetracycline or tetracycline of equal activity.

C. There is some indication that citric acid may exert a synergistic effect on the action of tetracyclines.

#### 4—Keeps Vegetables Marketable

Dripping perishable vegetables in a 25-ppm. oxytetracycline solution for 15 sec. can add several days to the storage life of peas, broccoli, lima beans, cauliflower, and spinach. This was revealed by G. Koch, Chas. Pfizer & Co., Brooklyn, N. Y.

Experimental vegetables were all stored at 86F. and 70-85% R. H. With peas and broccoli, control samples were badly rotted after 24 hr. of storage, and entirely spoiled after 48 hr. But antibiotic-treated vegetables were marketable after 24 hr. And they were considerably less spoiled than the controls after 48 hr.

Results with lima beans and cauliflower showed that the dip slowed the spoilage rate. Control samples were significantly more deteriorated than any of the dipped vegetables.

Antibiotic-treated spinach remained marketable after 48 hr. of storage, while controls showed considerable rot after 24 hr., and were totally spoiled after 48 hr.

In commercial practice, these vegetables should be stored at about 32F. and 85-90% R. H., conditions that inhibit microbial spoilage. However, decay is rapid once these items are exposed to higher temperatures, hence the potential benefits of antibiotic treatment.

End (Resume reading on page 57)

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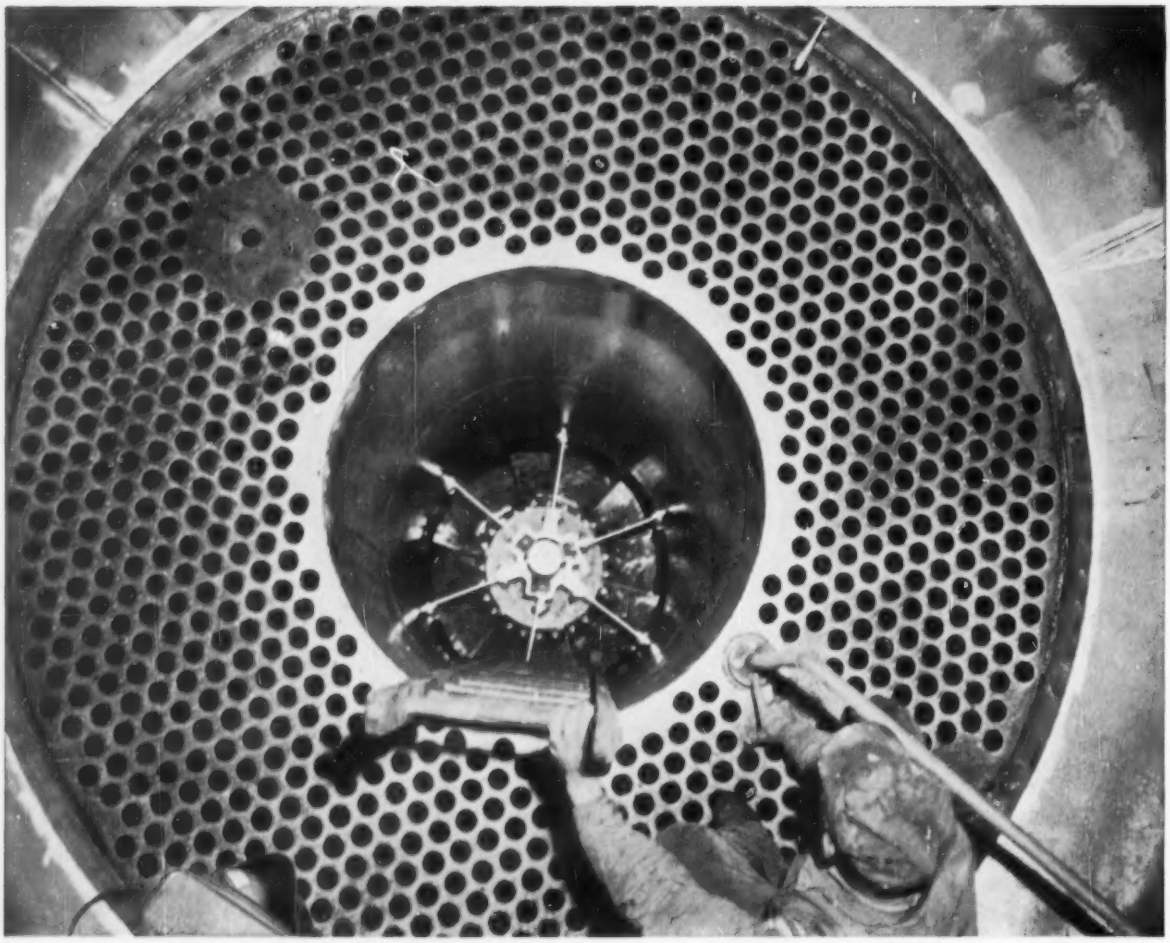

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Additional proof of how Carpenter quality pays off on job after job is available from your Carpenter Distributor. Discover the profitable difference Carpenter can make on your own processing and transfer lines, evaporators, heat exchangers and similar applications.

Talk to your Carpenter Distributor now about cost-savings you may be able to obtain by switching to Carpenter Stainless Tubing or Pipe. Remember, you are sure of getting the highest possible degree of perfection in Carpenter tubing because it must pass the most exacting non-destructive test ever applied to stainless tubing.

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# RECENT INVENTIONS

## PRODUCTS

**Sugar** Recovered by Purifying Molasses With Methanol and Acid, Separating Phases, Crystallizing—J. Van Julsingha, to N. V. Centrale Suiker Maatchaapij, Amsterdam, Netherlands. No. 2,759,857. Aug. 21, 1956.

**Glyceride Oil** Deodorized by Applying Vacuum to Thin Film—B. H. Thurman, New York City, to Kraft Cheese Co., Chicago. No. 2,759,883. Aug. 21, 1956.

**Food Product** in Form of Shallow, Crisp Plate—E. E. Lindsay, Los Angeles. No. 2,759,826. Aug. 21, 1956.

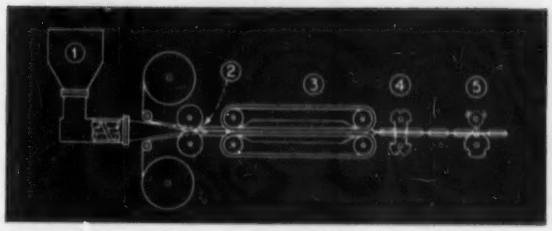
**Chocolate Product** Containing Non-Fat Milk Solids Self-Sustaining Above Melting Point of Cocoa Butter—M. W. Kempf, Auburndale, and P. J. Downey, Holbrook, Mass., to General Foods Corp., New York City. No. 2,760,867. Aug. 21, 1956.

**Maple-Honey** Spread by Inverting Maple Syrup, Mixing With Honey, Seeding With Dextrose, Crystallizing—J. Naghski, Philadelphia, C. O. Willits, Glenside, W. L. Porter, Philadelphia, and J. W. White, Jr., Willow Grove, Pa., to USA. No. 2,760,870. Aug. 28, 1956.

**Sweetening Composition** by Mixing Artificial Sweetener With Sugar and Hydrophilic Colloid, Wetting With Alcohol, Drying, Grinding—E. A. Ferguson, Jr., Brooklyn, N. Y. No. 2,761,783. Sept. 4, 1956.

**Canned Turkey** by Assembling Meat in Layers, Adding Flavor, Shaping, Applying Pressure, Freezing, Placing in Cans, Subjecting to Dry Heat, Sealing, Sterilizing.—F. George, Berkeley, Calif., to Norbest Turkey Growers Assn., Salt Lake City, Utah. No. 2,761,786. Sept. 4, 1956.

**Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.**




**Unit Forms, Wraps Individual Cheese Slabs**

Cheese food from hopper (1) is extruded through flat nozzle into continuous tube of wrapping film. Latter is formed by heat-sealing marginal edges of superimposed film strips (2). Slabs are formed and cooled in recesses of endless belts (3), then tube squares are sealed transversely (4). Cutting device (5) separates slabs at unsealed strip between squares.—*A. N. Nawrocki to Clearfield Cheese Co., Curwensville, Pa. No. 2,759,308. Aug. 21, 1956.*

## PACKAGING

**Closing** a Bag by Folding Wax-Coating Tape About Bag's End, Applying Wax-Treated Sealing Cord, Sewing Cord and Tape to Side Walls with Wax-Treated Thread, Melting Wax—K. A. Arnold, Oswego, to St. Regis Paper Co., New York City. No. 2,756,706. July 31, 1956.

**Produce Bag** Having Opposite Side Walls Connected at Their Edges by Gussets, Handle Openings in Both Walls—R. E. Adams, Hightstown, N. J. No. 2,756,922. July 31, 1956.

**Gabled-Top Milk Carton** Having V-Shaped Drinking, Pouring Spout—R. M. Hansen, White Bear Lake, Minn. No. 2,757,830. Aug. 7, 1956.

**Conveyorized Unit** Adapted to Form, Fill, and Seal Cartons—G. Meyer-Jagenberg and W. Drese, Dusseldorf, Germany. No. 2,757,498. Aug. 7, 1956.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**Bag Filler** Consisting of Article-Engaging Member, Suction Nozzles, Fail-Safe Device—R. J. Gaubert, to Simplex Packaging Machinery Co., Inc., Oakland, Calif. No. 2,757,842. Aug. 7, 1956.

**Wrapping Machine** Employing Arcuate Stuffer Tunnel, Article Support, Wrapper-Sheet Retainer, Reciprocating Plunger—A. W. Albrecht to Pearson Candy Co., St. Paul, Minn. No. 2,757,499. Aug. 7, 1956.

**Liquid-Proof Container** Comprising Tubular Body of Fibrous Stock, Bottom End Impregnated With Liquid-Proofing Material, Walls Similarly Coated—W. B. Elam, Jersey City, N. J., to American Can Co., New York City. No. 2,757,848. Aug. 7, 1956.

**Packaging Assembly** for Erecting Collapsed Cartons, Filling, Sealing—G. Dasch, New York City, to Sunray Food Products Corp., Bronx, N. Y. No. 2,757,502. Aug. 7, 1956.

**Throwaway Cap Remover** (Attached to Bottle) Comprising Angular Wire Ring, Fulcrum, Thumb-Engagable Tongue, Metal Band—C. Schmitz, Guttenberg, N. J. Nos. 2,757,814-15. Aug. 7, 1956.

**Dairy Wax Composition** Consisting of Narrow-Boiling Fraction of Refined Paraffin Wax Plus Polyethylene — R. M. Bailly, Little Silver, and H. F. Hitchcox, Cranford, N. J., to Esso Research & Engineering Co. No. 2,758,100. Aug. 7, 1956.

**Gravity Packer** Employing Frame-Mounted Hopper, Filling Spout, Flexible Sleeve, Bag-Clamping Jaws—H. V. Kindseth to Bemis Bro. Bag Co., Minneapolis. No. 2,757,894. Aug. 7, 1956.

**Antioxidant Wrapper** Comprising Rosin-Sized Paper Carrying 2,2'-Methylene Bis-4, 6 Dialkylphenol—J. C. Pullman, Stamford, and R. B. Porter, Jr., Darien, Conn., to American Cyanamid Co., New York City. No. 2,758,032. Aug. 7, 1956.

**Cap Feeder** Consisting of Hopper, Conveyor, Backing Receptacle, Cap-Turning Rolls, Inclined Guide—F. J. and R. L. Johnson, and F. J. Johnson, Jr., to Kinex Co., Needham Heights, Mass. No. 2,758,434 Aug. 14, 1956.

**Can Package** Having Container-Supporting Tabs Cut from Side Walls, Binding Strip—J. V. Manners, Oakland, Calif. No. 2,758,711. Aug. 14, 1956.

**Case Unloader** Employing Continuous Conveyor Bands, Spaced Pulleys, Means to Compress Bands Against Bottle Necks—A. C. Davis, Baltimore. No. 2,758,731. Aug. 14, 1956.

**Plastic Neck-Banding Tube**, 0.002-0.005 in. Thick, Having High Shrinkage Coefficient—S. T. Carter, Worcester, Mass., to Geo. J. Meyer Mfg. Co., Cudahy, Wis. No. 2,758,735. Aug. 14, 1956.

**Nozzle** for Removing Air From Head Space of Filled Can—J. M. Boyd, Chicago, and F. W. Parrin, Whittier, Calif., to Continental Can Co., New York City. No. 2,758,766. Aug. 14, 1956.

**Oxidation** Inhibitor, Packaged in Moisture-Proof Oxygen-Permeable Barrier and Placed in Hermetically Sealed Container, Oxygenator Consisting of Water, Glucose, and Enzyme System Having Glucose Oxidase Activity—D. Scott, to B. L. Sarett, Chicago. No. 2,758,932. Aug. 14, 1956.

**Packaging Unit** for Making Flexible Plastic Tubes With Perforation Line—T. E. Piazze, Mt. Vernon, Ohio, to Continental Can Co., Inc., New York City. No. 2,759,648. Aug. 21, 1956.

**No-Can—No-Fill** Device Having Movable Filling Valve Closed by Cam When Can Is Absent—J. T. Stigler, to Pfaudler Co., Rochester, N. Y. No. 2,759,649. Aug. 21, 1956.

**Freezable Package**, for Fruit Syrup Confection, Made of Heat-Sealable Cellophane and Polyethylene—J. Young, Detroit, and B. W. Colman, Berkley, Mich. No. 2,759,831. Aug. 21, 1956.

**Filling** Containers Under Vacuum and Reduced Oxygen—D. Eolkin, San Lorenzo, Calif., to Gerber Products Co., Fremont, Mich. No. 2,759,307. Aug. 21, 1956.

**Cheese-Cutting Machine** Having Means to Divide a Block Horizontally, Remove Top Unit From Stack—P. I. Hensgen, and W. A. Beland, Chicago, to Swift & Co. No. 2,760,248. Aug. 28, 1956.

**Automatic Case Filler** Patterns Containers, Deposits Them as a Unit—G. J. Okulicca and I. Zo-


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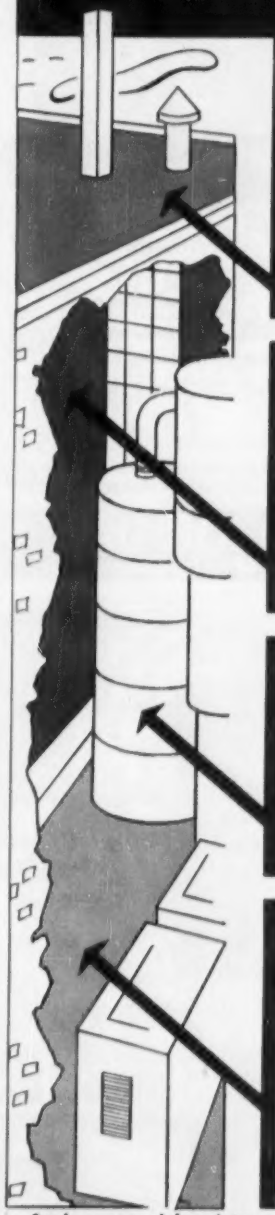

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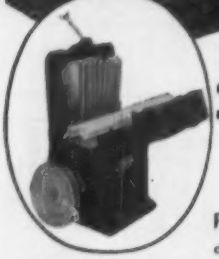

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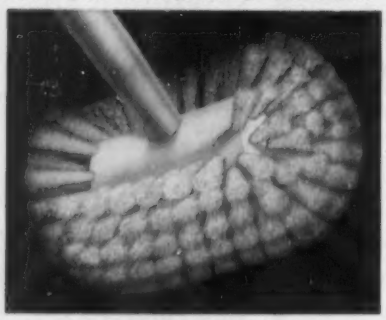

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goulin, Vancouver, B. C., Canada. No. 2,760,316. Aug. 28, 1956.

**Cheese Hoop** (Also Used as Aging and Shipping Container) Comprising Fiber Shell, Plastic Liners, Perforated Wooden Bottom, Metal Shell—C. Pauly, Port Washington, Wis. No. 2,760,430. Aug. 28, 1956.

**Wrapping Machine** Having Frame, Wrapping Channel, Bridging and Pushing Members, Conveyor—F. C. Crescenzo, Springfield, to Package Machy. Co., East Longmeadow, Mass. No. 2,760,621. Aug. 28, 1956.

**Semi-Solids Filler** Having Nozzles, Container-Receiving Pockets, Synchronizing Means — B. F. Phelps, to Sumersett Products Co., Chicago. No. 2,760,701. Aug. 28, 1956.

**Bagging, Weighing Unit** Adapted to Predetermined Weight of Material—F. Ahlburg, Los Angeles. No. 2,760,748. Aug. 28, 1956.

**Interleaving** Food Slabs With Divider Material by Laying Dividing Ribbon Across Horizontally Spaced Stack, Inserting Additional Units in Spaces—B. T. Hensgen, Chicago, and R. M. Faust, Westchester, Ill., to Swift & Co., Chicago. No. 2,760,871. Aug. 28, 1956.

## EQUIPMENT

**Roll Sizer and Slicer** Comprising Standards Mounted on Side Frames of Dough Conveyor, Upper and Lower Transverse Bars, Downwardly Diverging Arms, Vertically Reciprocal Horizontal Shaft, Blade Carrier —J. Anetsberger to Anetsberger Bros., Inc., Northbrook, Ill. No. 2,754,772. July 17, 1956.

**Meat Impregnator** Employing Conveyor, Dispensing Head, Needles, Pressurized Fluid, Synchronizing Means—F. A. Zaenkert, Greenhills, Ohio to Cincinnati Butchers' Supply Co. No. 2,756,666. July 31, 1956.

**Cone-Making Machine** Having Rotating Annular Baking Unit, Batter-Feed Means, Wafer Severing Device, Former Carrier—R. T. Wise, to Cream Cone Machine Co., Columbus, Ohio. No. 2,756,696. July 31, 1956.

**Container-Feed Mechanism** Comprising Downwardly Directed Guide, Rotary Vertical Disk, Circumferentially Spaced Fingers, Discharge Conveyor—S. H. Creed, Campbell, to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,756,862. July 31, 1956.

**Conveyor Chain** With Replaceable Flights—J. D. Russell and L. T. Felderman, Franklin, Pa., to Joy Mfg. Co., Pittsburgh. No. 2,756,867. July 31, 1956.

**Pallet** Having Integral Collapsible Container—J. M. Phillips, Pittsburgh, to Salem-Brosius, Inc. No. 2,756,894. July 31, 1956.

**Flour Valve** Consisting of Cylindrical Housing, Rotor, Radial Vanes—H. E. Temple, San Gabriel, Calif., to Read Standard Corp. No. 2,757,049. July 31, 1956.

**Sausage Peeler** Employing Cutter, Airblast Plow, Rotatable Slotted Follower — W. E. Parkes, Deer Park and W. W. Parkes, Sycamore Tp., Hamilton County, Ohio, to T. B. Cline, Cincinnati. No. 2,757,409. Aug. 7, 1956.

**Knife-Head Assembly** for Sausage-Skinner Comprising Pivotally Mounted Plate, Pipes, Skid, Blade—T. B. Cline, Sycamore Tp., Hamilton County, Ohio. No. 2,757,410. Aug. 7, 1956.

**Meat-Patty Former** Consisting of Backing Member, Rotatable Forming Plate, Circumferentially Spaced Openings, Extruder, Synchronized Feed and Ejector Means—H. M. Condon to Grand Duchess Steaks, Inc., Akron, Ohio. No. 2,757,411. Aug. 7, 1956.

**Doughnut-Filling** Unit Having Hollow Base, Horizontal Plate, Solenoid, Plunger, Rod, Funnel, Nozzle, Electrical Circuit —D. D. Ballew, Baltimore City, Md. No. 2,757,620. Aug. 7, 1956.

**Conveyor Belting** Comprising Textile-Fabric Ply Impregnated With Polyvinyl Chloride Composition—J. D. Crabbe, Liverpool and F. W. Warren, Wilmslow, to Dunlap Rubber Co., Ltd., London County, England. No. 2,757,709. Aug. 7, 1956.

**Dehydrating System** for Walls of Cold-Storage Room—C. G. Munters, Stocksund, Sweden. No. 2,758,390. Aug. 14, 1956.

**Bread-Cooling Conveyor** Employing Straight and Curved

Sections of Grid-Link Belt, Transverse Rods—W. E. Lanham, Atlanta. No. 2,758,391. Aug. 14, 1956.

**Countercurrent Centrifugal** Having Rotor, Side Plates, Peripheral Cylinderical Member, Feed and Discharge Ports—W. J. Podbielniak, Chicago, to W. G. Podbielniak. No. 2,758,783-84. Aug. 14, 1956.

**Dasher** for Ice Cream Freezer Consisting of Cylinder, Longitudinal Rods, Radial Posts, Radially Narrow Auger Blades—O. A. Vasby, Fort Atkinson, Wis. No. 2,758,823. Aug. 14 1956.

**Fowl-Picking Machine** Comprising Supporting Structure, Movable Picking Member—A. W. Sharp to Barker Poultry Equipment Co., Ottumwa, Iowa. No. 2,759,216. Aug. 21, 1956.

**Grain-Drying Unit** Having Suction Means, Vibrator, Restricted Outlet—F. Jonsson, to AB Svenska Flaktfabriken, Stockholm, Sweden. No. 2,759,274. Aug. 21, 1956.

**Electrical Viscometer** Employing Motor, Drag Member, Signal Means—A. R. Boyle, Glasgow, and C. Byrne, Clydebank, to Dobbie McInnis Ltd., Glasgow, Scotland. No. 2,759,355. Aug. 21, 1956.

**Sampler Cutter** Adapted to Divert Material in Chutes—R. L. Pate, to McNally, Pittsburg Mfg. Co., Pittsburg, Kans. No. 2,759,362. Aug. 21, 1956.

**Dumpling Apparatus** Consisting of Conveyor, Dough-Strip Depositing Means, Cutter, Crimper—H. E. Szadziewicz and H. Kubicki, Chicago. No. 2,759,433. Aug. 21, 1956.

**Conveyor** for Bottle Crate Unloader Having Means to Engage and Release Bottles—B. Copping, Cuyahoga Falls, to Akron, Inc., Ohio. No. 2,759,593. Aug. 21, 1956.

**Egg-Cracking Mechanism** Comprising Conveyor, Egg-Positioning Means—C. H. Willsey, Topeka, Kans. No. 2,760,536. Aug. 28, 1956.

**Belt Conveyor** With Frame, Roller Forming Belt-Like Trough, Shortening Means—J. Thomson, to Mavor & Coulson, Ltd., Glasgow, Scotland. No. 2,760,623. Aug. 28, 1956.

## PROCESSES

**Skinning** Fish by Removing Bone, Splitting, Arcing Fish Half. Cutting—G. E. Hube, Bellingham, to Pacific Laboratories, Inc., S. Bellingham, Wash. No. 2,757,413. Aug. 7, 1956.

**Drawing Off** Wort From Brewing Mash by Syphoning From Top of Extract While Macerating Mash—A. Z. Metz, Torreon, Coahuila, Mexico. No. 2,758,030. Aug. 7, 1956.

**Preserving** Unpeeled Shrimp With Aqueous Dextran—H. A. Toulmin, Jr., to Commonwealth Engineering Co. of Ohio, Dayton. No. 2,758,929-930. Aug. 14, 1956.

**Converting** Glucose to Gluconic Acid Enzymatically by Adding Successive Increments of Hydrogen Peroxide in Decreasing Amounts—D. Scott to B. L. Sarett, Chicago. No. 2,758,934. Aug. 14, 1956.

**Removing** Fine Particles From Foods by Agitating in Air Stream—A. Jacobs, New Hyde Park, to Mason, Au & Magenheimer Co., Mineola, N. Y. No. 2,759,437. Aug. 21, 1956.

**Inhibiting** Discoloration of Polyphenolic Fat Antioxidants in Shortening by Emulsifying With Acidic Stabilizer—K. F. Mattil, Chicago and R. J. Sims, LaGrange, Ill., to Swift & Co., Chicago. No. 2,759,829. Aug. 21, 1956.

**Improving** Starch by Continuous Centrifuging of Magma Containing Starch, Gluten, Fibrous Material—A. Peltzer, Sr., San Francisco, to Dorr-Oliver, Inc., Stamford, Conn. No. 2,760,889. Aug. 28, 1956.

**Recovering** Meat From Poultry Necks by Violent Impact of Material Within Basket—H. F. Geisler and J. R. Thompson, Tucker, Ga., to Meat Separator Corp. No. 2,761,479. Sept. 4, 1956.

**Making** Cheese in Telescopic Frusto-Conical Hoops—C. and M. L. Cohen, to Chain-O-Lakes, Inc., Waupaca, Wis. No. 2,761,376. Sept. 4, 1956.

**Hydrogenating** Fats Continuously by Adding Catalyst in Response to Hydrogen Flow—W. F. Bollens, Chicago, to Swift & Co. No. 2,762,819. Sept. 11, 1956.


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## Lowers Sanitation Cost

—Continued from page 73

and use of standards of performance.

As soon as enough data are available to reveal a better way of doing the work, that particular method should be closely checked for accuracy of basic information. Then the tools, materials, personnel, and procedures should be surveyed so that the reasons for the method's success are clearly understood.

We believe that the fairer, more skillful adminstration of our program, made possible by this analytical approach, will cement cordial relations with our employees. By measurment and the establishment of standards, work loads have been distributed more equitably.

In some instances use of better equipment, justified by work measurement, has cut drudgery and fatigue. Furthermore, when gratifying results have been produced by better methods, sanitors have had more reason for satisfaction an l pride in their work.

In addition, sanitation foremen have been able to measure and ascertain superior performance, and to give suitable recognition for it.

*The above article is based on a paper presented by the author at the recent First International Sanitation Maintenance Show & Conference in New York City.*

*End* (Resume reading on page 73)

## Selecting Molded Plastics

—Continued from page 77

Modulus of elasticity is a technical measurement of rigidity when material is subjected to stress. Tensile strength is the greatest longitudinal stress a substance can bear without tearing. Flexural strength is resistance to continual bending.

These properties are plotted in the accompanying graphs. High-impact styrene is also included to show the effect upon these properties of the inclusion of the rubber component. Styrene and high-impact styrene have found extensive application in rigid containers.

As seen in the graphs, polyethylene has a greater impact strength than styrene because of its shock absorption. Because of this toughness and because higher elongation makes it suitable for molded undercuts, polyethylene has found extensive use in container lids.

Both styrene and polyethylene have very low moisture absorption—less than 0.04%. This means that containers made of these plastics will not be affected by wide variations in humidity, by immersion in water, or by water in the foods packaged. They also have excellent dimensional stability over a wide temperature range.

The factor of toxicity is an important one to the volume use of any material in packaging. If the question of possible dermatological and toxicological effects is not entirely clear, the vast food market is ruled out of its potential.

A packaging material must be essentially inert to common foodstuffs. It must have nothing toxic in its composition which may be leached or extracted by the product it contains. This is strictly legislated by law and administered by governmental agencies. Both styrene and polyethylene have passed exhaustive tests in this regard.

Some packages must prevent moisture from escaping from the contents. Other packages must keep contents dry. Here, ability of the packaging material is measured by its property of "moisture-vapor transmission." This is defined as the number of grams of moisture passing through a 1 mil (.001 in.) thickness of a 1 sq. in area of the material in a 24 hr. period.

*End* (Resume reading on page 78)

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Bulletin 54 DJ—Dairy Industry Trucks

Booklet 53 SR—General Purpose Trucks and Barrel Handling Equipment

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# MEN & COMPANIES

## Industry

**Beatrice Foods Co.** has acquired all assets and business of Associated Dairy Products Co., Glendale, Ariz. The acquisition was effected by former exchanging common stock for latter's assets.

**Campbell Soup Co.** plans to spend $30 million on expansion of plant facilities before the start of the 1957 fiscal year.

**Canadian Canners Ltd.** announces that a majority interest in its common stock has been purchased by California Packing Corp.

**Circus Foods, Inc.,** San Francisco, has acquired Euclid Candy Co. of the same city.

**Coca-Cola Bottling Co. of New York, Inc.,** plans to construct a multi-million-dollar bottling and distribution plant in Brooklyn.

**Concordia Chocolates, Inc.** is now operating a new plant in Berkeley, Calif., for the making of chocolates in plastic molds.

**Consolidated Foods Corp.,** Chicago, announces acquisition of Morey Mercantile Co., Denver food processor. Also added to Chicago firm's organization is Klein's Super Markets, St. Paul.

**Cook Chocolate Co.,** Chicago, plans a $1 million building designed for blending and roasting of cocoa beans from South America and Africa.

**Cudahy Packing Co.,** Omaha, reports the purchase of Blue Ribbon Packing Co., Houston, in a cash transaction.

**Dole Hawaiian Pineapple Co.** has embarked upon an expansion program to double capacity in its frozen concentrated pineapple juice plant at Honolulu.

**Fremont Kraut Co.,** Fremont, Ohio, reports purchase of J. Weller Co.'s kraut factory in Clay, N. Y.

**Froedtert Malt Corp.,** Milwaukee, is making its research facilities available to food technologists and other researchers in industry interested in further experimentation in malt field.

**General Mills, Inc.,** Minneapolis, announces purchase of Ready-To-Bake Foods, Inc., Los Angeles. Latter produces and distributes refrigerated biscuits under the name Puffin.

**Jos. Schlitz Brewing Co.** has purchased land for a $20 million brewery in Tampa, Fla.

**Economy Sausage Co., Ltd.,** Vancouver, B. C. will erect a 15,000 sq. ft. building for preparation of cooked meats and sausages in Burnaby, B.C.

**Major Italian Food Co.** is building a $300,000 plant in Seattle for making Majorette Brand macaroni.

**Meletio Co., St. Louis,** announces purchase of Dinner Bell Foods of that city.

**Crown Zellerbach Corp.** announces the election of Alfred B. Layton, left, to the post of president, and Reed O. Hunt, right, as executive v.-p. J. D. Zellerbach, president for 18 years, was elected board chairman.


## *New "Built-in" Process Refractometer Assures Continuous . . . Accurate . . . Easy Quality Control*

The internationally known GOLDBERG PROCESS REFRACTOMETER is designed for the continuous precise, rapid and easy determination of total soluble solids . . . in turbid and dark-colored concentrates, jellies, jams, pastes, purees, juices, syrups, preserves, milk products . . . and in other solutions.

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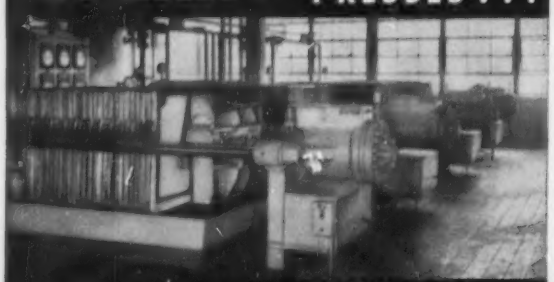

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**Pepsi-Cola International** has opened a bottling plant in Salisbury, Southern Rhodesia. This increases number of overseas Pepsi-Cola plants to 254.

**Pillsbury Mills, Inc.,** announces opening of a large food distributing center in Chattanooga, Tenn., to serve company's accounts east of Mississippi River and south of Kentucky.

**Shiriff-Horsey Corp., Ltd.,** Canada, reports the purchase of a 50% interest in Green Giant of Canada, Ltd.

**Poultry Producers of Central California,** has started construction on its $2.5 million egg packing plant in San Leandro, Calif. It is expected to be in operation by Aug. 1957.

**J. Allan Adams** has been named assistant to the managing director of the Kellogg Co. of Great Britan, Ltd.

## Personnel

**William E. Bien** has been appointed general manager of Brewery Sales Div., Anheuser-Busch, Inc., St. Louis.

**Harold S. Clark** announces he will retire from active management of D. L. Clark Candy Co. He has been in the candy field for almost half a century.

**Hugh Daley,** fleet superintendent, Idaho Creameries Div. of Beatrice Foods Co., Boise, Ida., has received National Safety Council's first place award for driver safety performance.

**Gordon Edwards** has been elevated to the position of v.-p. by Kraft Foods Co.

**Martin J. Framberger,** Madison, Wis., will take over office of general manager of American Dairy Assn. on Jan. 1.

**Ernest W. Greene** is newly appointed permanent pres. of Sugar Assn., Inc., and will have an office in Washington as a full-time executive of organization.

**William J. Hoover** is now manager of technical services for Corn Industries Research Foundation, Inc., Washington, D. C.

**Harry R. Hambleton** has been named v.-p. in charge of Mexico operations for Pepsi-Cola International.

**Kai Jakobsen** has been appointed director of quality control for H. W. Rickel Malt Co., Detroit.

**Thomas C. Law, Jr.,** has been named to direct the advanced sales plans section of Coca-Cola Co.

**Aaron G. Marcus** is now district manager, Territory of Hawaii, for Beatrice Foods Co., Chicago.

**Francis J. Oelerich, Richard D. Fellows, Gordon Perry,** and **George Levison** have been elected pres., v.-p., sec., and treas., respectively, for Midwest Preservers Assn., regional associate of National Preservers Association, Washington, D. C.

**Edward C. Parker,** Tetley Tea Co., is new pres. of Tea Assn. of U. S. A.

**George G. Richstone,** president, Richstone Bakeries Inc., Montreal, Canada, is named director, National Council of the Baking Industry of Canada, Ottawa.

**Justin Schmit** is the newly appointed v.-p. of operations for Chun King Sales, Duluth, Minn.

**Joseph L. Schweitzer** is new president and general manager of Bauer-Schweitzer Malting Co., San Francisco.

**Parker B. Smith** is new general manager of Borden Co.'s Chemical Div.'s International Dept.

**Lawrence J. Spatz** new controller of the central distributing division of Consolidated Foods Corp., Chicago.

**Stanley G. Tarrant** has been named president of Cedergreen Frozen Pack Corp., Bellingham, Wash.

## Associated Industry

**American Can Co.** has elevated George J. Madge to position of v.-p., executive department.

**American Viscose Corp.,** Philadelphia, announces appointment of Albert G. Ruff, Jr., as manufacturing superintendent at its Marcus Hook Film Div. plant.

**Beckman Instruments, Inc.,** reports assignment of Ralph S. White to the post of manager of research and development for its Spinco Div., Belmont, Calif.

**Bemis Bro. Bag Co.,** St. Louis, has elevated H. V. Kindseth to the post of director of research.

**Beverage Machinery Manufacturers Assn., Inc.,** Washington, D. C., has named John Marshall as secretary.

**Borg-Warner Corp.,** Chicago, announces appointment of G. W. Kelch as president of the recently acquired Ingersoll-Humphryes Div., Mansfield, Ohio. Also reported is election of Stanley J. Roush to newly created Borg-Warner post of group v.-p., and election of Henry M. Haase as v.-p. in charge of engineering and research.

**Capitol Products Corp.,** Mechanicsburg, Pa., reports acquisition of Read Standard Corp. by merger. Read Standard will become a division.

**Container Laboratories, Inc.,** reports election of James A. Sargent to the post of v.-p. He will also continue to manage the Chicago division of the firm.

**Carbide & Carbon Chemicals Co.,** div. of Union Carbide & Carbon Corp., announces that its Torrance, Calif., petrochemicals plant is in full operation.

**Continental Can Co.** has appointed B. J. Kearney as general manager of research and development of its Paper Container Div. Also, Peter P. Wojtul has been named v.-p. of the company's Fiber Drum Div.

**Crescent Corp.,** Tulsa, Okla., has acquired the assets of Win-Well Corp., Los Angeles, and formed a new corporation to be known as Win-Well Mfg. Co.

**Crown Cork & Seal Co., Inc.,** has appointed John L. Carnie general manager of its can division.

**Crown Zellerbach Corp.** announces plans for an $8 million plant at Antioch, Calif. It also reports appointment of Dr. J. S. Barton to the post of director of packaging and development for its Western - Waxide Specialty Packaging Div.

**Dairy Pack Inc.,** Cleveland, announces appointment of Charles L. Slagle to the post of v.-p. and general sales manager.

**Diamond Alkali Co.,** Cleveland, has named Dr. Nelson V. Seeger as associate director of exploratory research.

**Dresser Industries, Inc.,** has elected H. N. Mallon board chairman, and J. B. O'Connor president.

**Frank G. Hough Co.,** Libertyville, Ill., subsidiary of International Harvester Co., reports election of Frank G. Hough, as board chairman, and of G. A. Gilbertson as president, and chief operating officer.

**Milwaukee Valve Co.** Schiller Park, Ill., has appointed Carl E. Rowe v.-p. and general manager.

**Minneapolis-Honeywell Regulator Co.** announces purchase of Davies Laboratories, Inc., Beltsville, Md. The acquisition involved an exchange of stock.

**Mixing Equipment Co., Inc.,** Rochester, N. Y., has elevated Richard D. Boutros to the post of v.-p. and director of engineering.

**Refrigeration Corp. of America** has elected Nathan Straus III as exec. v.-p., treasurer, and board member.

**Thatcher Glass Mfg. Co., Inc.,** has expanded its Saugus, Calif., plant to double capacity.

**The Trane Co.,** La Crosse, Wis., announces the retirement of Grant E. Cole, executive v.-p. and general manager of Trane Co. of Canada, Ltd.

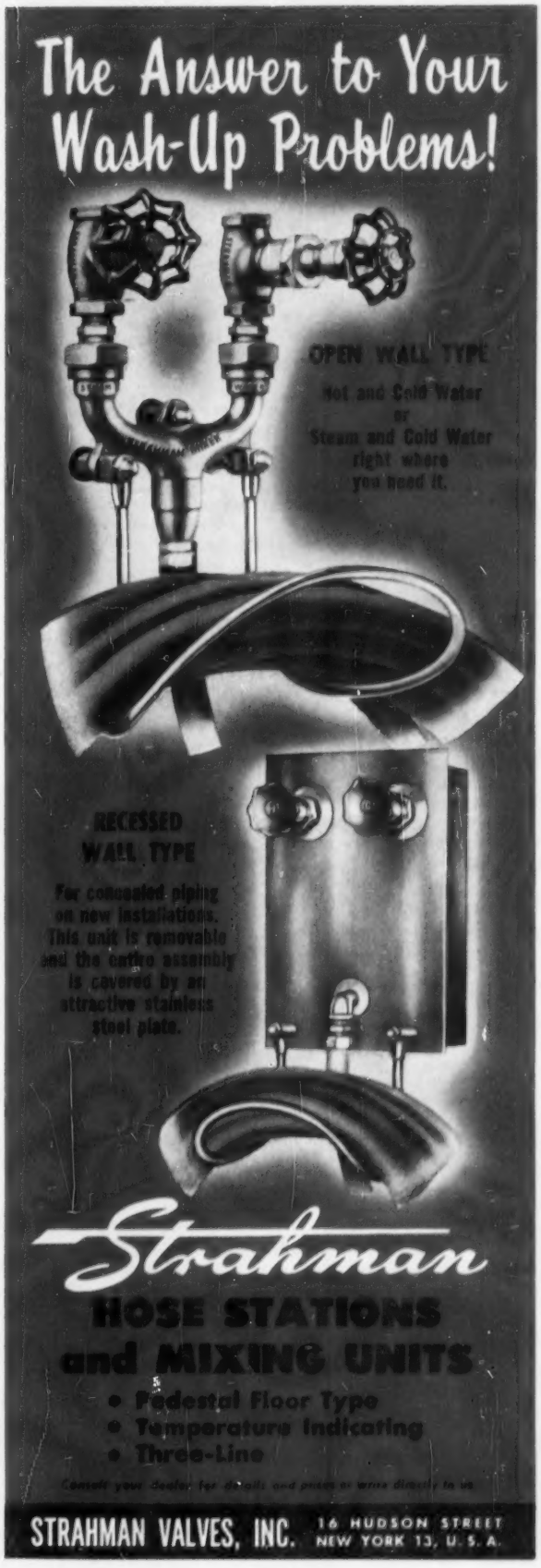
## Deaths

**Douglas C. Beeler,** 55, western district supervisor of food and vegetable inspection for USDA.

**E. Fred Keil,** plant superintendent for F. M. Drew Co., Santa Clara, Calif.

**Albert M. Marsh,** 73, retired food industry representative of Allis-Chalmers Industries Group.

**James R. Mason,** 62, southern district manager, Great Western Sugar Co.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**EXCHANGE**
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A natural fruit pectin that jells without sugar. Completely tasteless, permitting the use of the most delicate flavors . . . allows the natural juicy fruit flavor to come through. Controls "running" or "weeping" in pies when cut. Famous too for aspics, jellied fruit or vegetable salads, dietetic preserves or non-sugar jells.

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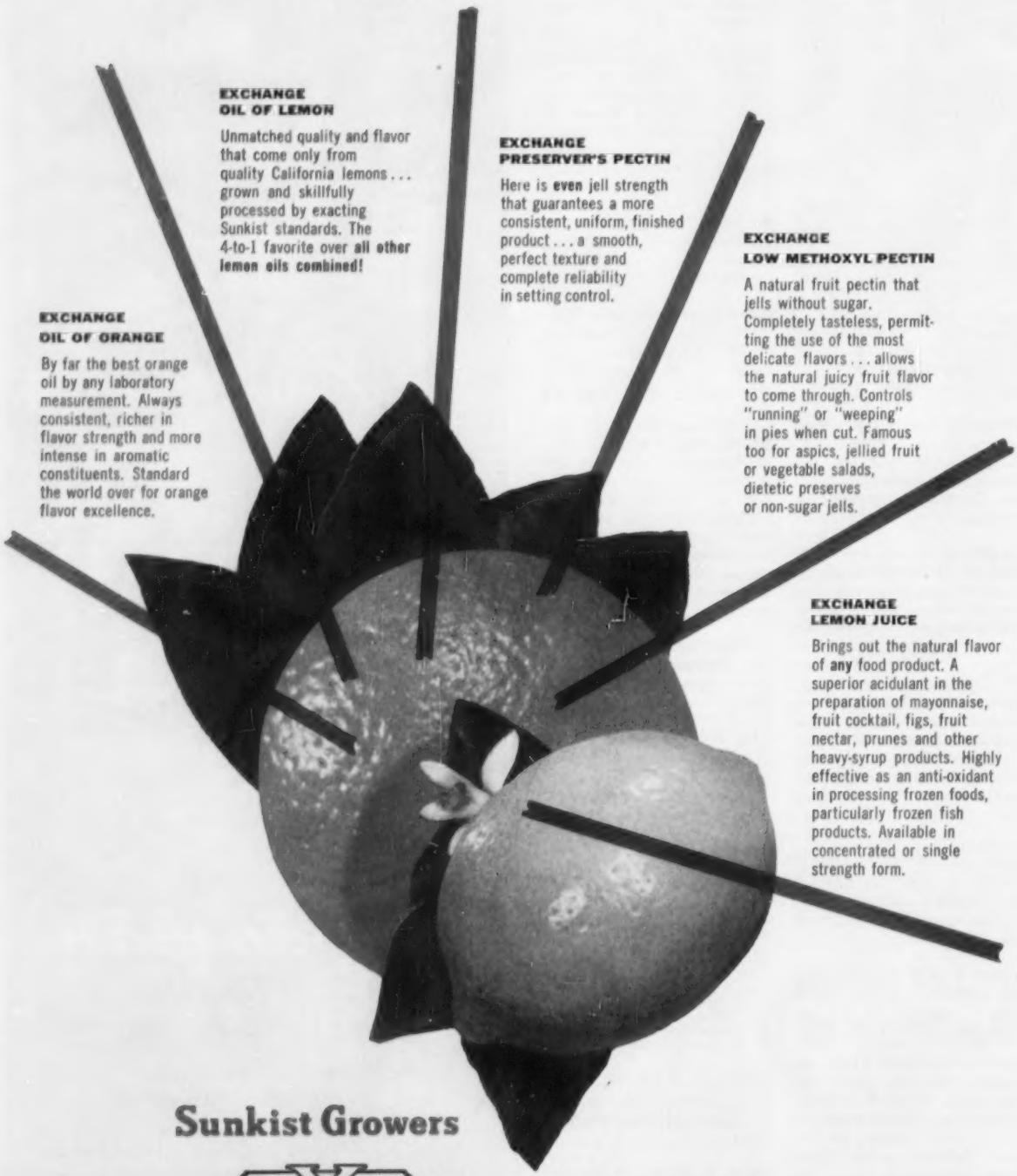

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## PLANT ENGINEERING

### Turbine Generators

Comprehensive manual gives complete facts, pictures, and engineering cutaway drawings for a series of steam-turbine electric generators, rated from 2,500 to 40,000 kw. Diagrams illustrate operation, graphs show pertinent engineering facts. *Bulletin GEA-3277C, 54p. — General Electric Co., Schenectady, N. Y. (195A)*

### Variable Speed Drives

Advantages of a series of compact, belt-type variable-speed drives in the ¼ to 25 hp. range are discussed. Various remote controlling devices are also pictured and considered. *Bulletin 1610-B1, 8p.—Worthington Corp., Harrison, N. J. (195B)*

### Thin-Wall Tubing

Discusses various engineering features and fabrication methods for large diameter, thin-wall steel tubing, available in several alloys. Tubes are fabricated in ¾ to 2½ in. O.D., and they answer many problems in heat exchanging, cooling, fuel, and oil line applications. *Data Memorandum 4, 6p.—Superior Tube Co., Norristown, Pa. (195C)*

### Cold-Water Deaerator

Discusses advantages and operation of a cold-water deaerating unit for boiler feedwater, said to reduce corrosion and give efficient deaeration without heating or cooling. Multi-stage units available. *Publication 4653, 4p.—Cochrane Corp., Philadelphia. (195D)*

### Steam Trap Selection

Flow diagram shows complete installation of impulse-type steam traps in a typical chemical processing operation. Units are seen adaptable to many similar food applications. Numerous charts clearly list selection data. *12p.—Yarnall-Waring Co., Philadelphia. (195E)*

### Conveyor Pulleys

Tables list full selection data and prices on large group of solid-steel conveyor pulleys with demountable taper-bushed hubs. Face sizes range from 12 to 66 in. *Bulletin CP-80, 12p.—R. & J. Dick Co., Inc., Passaic, N. J. (195F)*

### Magnetic Separators

Treats of a line of permanent magnets for elimination of tramp iron in food products. Units are available in various designs—such as plates, sweepers, drums, grids, and troughs. Various specialized units also shown. *Catalog 156, 16p.—Magni-Power Co., Wooster, Ohio. (195G)*

### Interchangeable Pumps

Gives full facts on a series of centrifugal pumps, and details manner in which bearing housing, back plates, impellers, and volute cases can be interchanged to suit the particular product application. Cutaway views show pump construction. *Bulletin B-1608, 12p.—Food Machinery & Chemical Corp., Peerless Pump Div., Los Angeles. (195H)*

### Chart for Plastics

A quick-reading check chart shows mechanical, electrical, thermal, chemical, and physical properties of a series of seven plastic materials — available in sheets, rods, tubes, film, tape, slabs, strips, disks, and slugs, and other forms. *4p—Commercial Plastics & Supply Corp., New York City. (195I)*

### Control Valves

Diagrams and describes valves that utilize single-seated, split-valve bodies and cylinder-motor power actuators. Flow characteristics and formulas, dimensions, and capacity factors are included. *Bulletin LB-2, 12p.—Conoflow Corp., Philadelphia. (195J)*

### Air Cooling Units

Describes manufacturing details, principles, and several adaptations of a series of air cooling machines. Dimension drawings of equipment and accessories are shown. *Bulletin 185-H, 12p.—Frick Co., Waynesboro, Pa. (195K)*

### Proportioning Pumps

Furnishes data on a reciprocating, mechanical-drive metering and proportioning pump for small flow applications. Bulletin 602, 8p.—*Hills-McCanna Co., Chicago, (195L)*

### Humidifying Principles

Considers humidification terminology and application. Humidifiers and humidity instruments are priced. *Bulletin 492, 4p.—Abbeon Supply Co., Jamaica, N. Y. (195M)*

### Fusion-Welded Tubing

Describes fabrication of cold-rolled and drawn tubing. Sizes up to 2.5 in. OD are available. *Data Memo 2, 5p.—Superior Tube Co., Norristown, Pa. (195N)*

### PVC Piping

Lists new reduced prices on all types of unplasticized polyvinyl chloride pipes and fittings. *4p.—Carpenter Steel Co., Union, N. J. (195O)*

### Air Duct Units

Describes a turning device for cutting pressure losses in corners of air duct systems. Sizes and pressure loss data chart are included. *Catalog F7912, 4p.—Barber-Colman Co., Rockford, Ill. (195P)*

### Boiler Fittings

Dos and don'ts of boiler operation as well as piping diagrams are described. Line of boiler fittings is pictured. *16p.—McDonnell & Miller Inc., Chicago. (195Q)*

### Polyethylene Pipe

Includes sizes of pipe and fittings, installation notes, technical data, applications, and water flow rates for various polyethylene pipe sizes. The pipe is flexible and approved for drinking water. *Bulletin CE-57A 8p.—American Hard Rubber Co., New York. (195R)*

### Glass Mosaic Tiling

Full-color illustrations show uses for a line of glass, mosaic tile. Durability data and shipping specifications are included. 8p.—*American Import & Export Co., Philadelphia. (195S)*

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### Lighting Cost Analysis

Two tables break down industrial lighting costs for high and low mountings. Charts outline basic data, initial costs, and annual operating expenses. *4p.—General Electric Co., Cleveland. (195T)*

### Three Fan Lines

Covers design principles of impeller, structural features, shafts, bearings for three series of fans. Complete, colored performance characteristic curves are included for each line. Booklets also have tables of dimensions, recommended fan operating conditions, and descriptions of all components. *Bulletin FD-106, FD-205, and F-200. 48p.—Buffalo Forge Co., Buffalo. (195U)*

### Diaphragm Valve

Concerns specifications for valves of varied body and diaphragm construction. Diaphragm is seated against weir under pressure from the compressor or hand wheel. *Catalog 100, 12 p.—Hills-McCanna Co., Chicago. (195V)*

### Water Softeners

Deals with operation and expected results of hot, lime-zeolite, water softeners. Has flow diagrams of downflow and sludge-blanket types. *Publication 4801-A, 4p.—Cochrane Corp., Philadelphia. (195W)*

### Wire Screens

Catalogs most popular wire screen items according to width of opening, diameter of wire, percent open area, and pounds per sq. ft. *Bulletin 10, 4p.—Cleveland Wire Cloth & Mfg. Co., Cleveland. (195X)*

### Stainless Steel Castings

Discusses problems of design and construction of fruit juice processing equipment. Four processes are detailed and a chart shows types of corrosion resistant stainless steel castings used. *6p.—Alloy Casting Institute, Mineola, N. Y. (195Y)*

### Steam-Jet Vacuum Pumps

Three-color diagrams detail operating principles for a line of steam-jet vacuum pump. Applications, construction, and operation are highlighted for both condensing and non-condensing types. Sizes are in tabular form along with performance characteristics for three-stage pumps. *Bulletin 5H3, 8p.—Schutte & Koerting Co., Cornwells Heights, Pa. (195Z)*

### Acid-Handling Pumps

Contains photographs, cross-sectional wash drawings, and performance and power requirement graphs for some acid-handling pumps. Units are designed for efficiency, and all parts have corrosion-resistant linings. *Bulletin 5004, 6p.—Dorr-Oliver Inc., Stamford, Conn. (195AA)*

### Synchronous Motors

Pictured in color, synchronous-induction motors are recommended where constant speed is needed, where several motors operate at fixed speed ratios, and where accu-

rate speed adjustment is needed. Drip-proof, splash-proof, totally-enclosed, and explosion-proof designs are available. *Bulletin 51B8440A, 4p.—Allis-Chalmers Mfg. Co., Milwaukee. (195BB)*

### Hermetic Compressors

Photos, dimension diagrams, and specification lists are presented here for a line of four hermetic compressors. *Bulletins C-1100-S117, 118, 119, 120, 8p.—Worthington Corp., Harrison, N. J. (196A)*

### Stainless Steel Screen

Emphasizes various shapes and applications of stainless steel screens. Technical data includes weight per sq. ft. of screen, open area, and comparative screen dimensions. *28p.—Bixby-Zimmer Engineering Co., Galesburg. Ill. (196B)*

### Back Pressure Valve

Describes corrosion-resistant relief valve and back pressure valve that can be used up to 1500 psi. and 250F. *Bulletin 1255-B, 2p.—Milton Roy Co., Philadelphia. (196C)*

### Electric Heaters

Cartridge, strip, immersion, and cylindrical heaters are described. Ratings up to 375 watts per sq. in. can be obtained. *Bulletin 355, 6p.—Watlow Electric Mfg. Co., St. Louis. (196D)*

### Heat Exchangers

Contains design, capacity, and dimension data for removable-tube-bundle heat exchangers. Instructions for using the data to select and specify heat exchangers are also given. *Catalog 1156, 16p.—Young Radiator Co., Racine, Wis. (196E)*

## MAINTENANCE

### Ball Bearings

Detailed cross-section drawings show ball-bearings, said to be effective under extreme conditions of dust, dirt, and grit. Gives complete listing and ratings. *6p.—Fafnir Bearing Co., New Britain, Conn. (196F)*

### Grommet V-Belt

Describes make-up of V-type belt, designed to increase efficiency. Twin Grommets are surrounded by rubber and enclosed in a flexible, resilient cushion. Bulletin 20B6497C, *4p.—Allis-Chalmers Mfg. Co., Milwaukee. (196G)*

### Grease Lubrication

Full-color pictures show best operating conditions for a series of greases. Explains theory and performance characteristics of these lubricants, and discloses some general misconceptions. *Lubrication, No. 10, 12p.—The Texas Co., N.Y.C. (196H)*

### Masonry Coatings

Gives features, colors, and other specifications for a rubber-based masonry coating for outside applications. It can be brushed or sprayed. *2p.—Wilbur & Williams Co., Boston. (1961)*

### Belt Fasteners

Illustrates a hinge device for coupling heavy-duty belt conveyors. Pictures show installation steps. Table lists sizes and prices. *Bulletin HF-500A. 4p.—Flexible Steel Lacing Co., Chicago. (196I)*

### Truck Casters

Tells how to select the proper truck casters and wheels for any job, and specifies a wide line of wheels, casters, hand trucks, platforms and dollies. *Catalog K-40, 68p.—Bond Foundry & Machine Co, Manheim, Pa (196K)*

### Leveling Jacks

Considers models, sizes, and capacities, of a group of leveling jacks, together with data on reducing vibrations in machines. *4p.—Enterprise Machine Parts Corp., Detroit. (196L)*

### Wash-Up Hose

Comprises information on the heat-resistant inner tube, steel wire carcass, and white neoprene cover of a hose designed for wash-up applications. Inside diameters up to 1¼ in. *1p.—Acme Rubber Mfg. Co., Trenton, N. J. (196M)*

### Boiler Water Chemical

Discusses hydrazine solution for removing dissolved oxygen from boiler feed water. Covers determination of dosage, recommended methods of application, testing methods, and properties and handling of the material. Case studies presented for each of three boiler classes. *16p.—Olin Mathieson Chemical Corp., N.Y.C. (196N)*

### Masonry Preservative

Treats of a rubber-base vehicle for preserving masonry. One thick coat produces a textured surface similar to a sand finish. *File 25C-2, 2p.—Tremco Mfg. Co., Cleveland. (196O)*

### Screw Machine Products

Depicts screw machine work in a variety of tough alloys including stainless steel, Inconel, nickel and titanium. *4p.—Allmetal Screw Products Co. Inc., Garden City, N. Y. (196P)*

### Locating Compressor Troubles

Cartoon bulletin shows how to locate and correct operating troubles in air-cooled and water-cooled air compressors. Eighteen pointers are illustrated. *4p.—Worthington Corp., Harrison, N. J. (196Q)*

## MATERIALS HANDLING

### Fork Truck

Gives part-by-part discussion of all major components for an electric fork truck. Capacity is 3,000-lb. with 48-in. load, and other specifications are listed. *Bulletin B-575, 4p.—Elwell Parker Electric Co., Cleveland. (196R)*

### Portable Conveyors

Concerns stands, curved and straight sections, and three-way switches for a portable conveyor system. Many applications are shown. *Bulletin 15, 8p.—E. W. Buschman Co., Cincinnati. (196S)*

### Portable Lifts

Photos show a line of portable lifts. Description of components and lists of dimensions are included with applications. *10p.—Oster Mfg. Co., Cleveland. (196T)*

### Electric Tractor

Low seat height, convenient trailer hitch, and simple controls are stressed for an electric plant tractor. Mechanical and electrical features, and performance are also covered. *Bulletin 6018A, 2p.—Automatic Tansportation Co., Chicago. (196U)*

### Case Conveyor Chains

Describes chains that flex in two directions—laterally to a radius of as little as 12 in.—for use in case conveying applications. *Bulletin 56-73, 4p.—Chain Belt Co., Milwaukee. (196V)*

### New Fork Truck

Gives drawings and specifications for a gas-powered, electric-drive fork truck, with a capacity of 10,000 lb. No gear shifting is required. *Bulletin 6007A, 4p.—Automatic Transportation Co., Chicago. (196W)*

### Trucks & Racks

Line of hand trucks and storage racks are detailed. Photos and tables cover dimensions and capacities. *Catalog 29-1, 20p.—Lewis-Shepard Products, Inc., Watertown, Mass. (196X)*

### Expendable Pallet Line

Details a paper-board pallet that is handled like wooden models, and supports up to 1 ton. Delivered knocked down, these units reduce pallet storage, control, inventory, and bookkeeping. *4p.—Titan Pallet Co. Inc., New York City. (196Y)*

### Electronic Tractor

Illustrates use of an operatorless truck, guided by an under-floor wire. Starting, stopping, and switching is controlled by push-buttons. Bulletin 566, *4p.—Barret-Cravens Co., Northbrook, Ill. (196Z)*

### Electric Lift Truck

Details specifications and features for a new 2,500-lb., electric, fork lift truck. The carrying unit incorporates a 24-volt electrical system and high pressure hydraulic lines. *Circular 33E, 2p.—Lewis-Shepard Products, Inc., Watertown, Mass. (196AA)*

### Multi-purpose Conveyors

Diagrams and gives brief information on a series of multi-purpose conveyor belts, powered by either electricity or gasoline. Units are available in lengths from 4 to 40 ft. and widths to 24 in. The basic unit can be arranged with a variety of portable mountings or permanent setups. *Bulletin 103, 4p.—New London Engineering Co., New London, Wis. (196BB)*

## PACKAGING

### Silicone Bottle Spray

Treats of bottle-spraying process for improving appearance, increasing production speeds, decreasing bottle breakage, and upping bottle life. Coating lubricates bottle's exterior and prevents the scratches that weaken glass. *12p.—Thatcher Glass Mfg. Co. Inc., Elmira, N. Y. (196CC)*

### Overwrap Machine

Describes units for underfolding, overwrapping, and heat sealing. Package size range, space requirements, and specifications are included. *6p.—Elgin Mfg. Co., Elgin, Ill. (196DD)*

### Case-Sealer Line

Schematic drawings show operation, tables list specifications for a line of case sealers. Units and accessories are pictured. *Brochure 105, 4p.—Elliott Mfg. Co., Fresno, Calif. (196EE)*

### Steel Container Directory

Gives 1956-57 listing of members of the Steel Shipping Container Institute. Directory also notes manufacturing plant locations. *32p.—Steel Shipping Container Institute, New York City. (196FF)*

### Can Laboratory

Full color booklet presents guided tour through a can company's new research and engineering center. Text describes activities. *22p.—Continental Can Co., New York City. (196GG)*

### Corrugated Box Specs

Pocket booklet gives comprehensive information on how to specify corrugated boxes. Close-up photos show box construction details and other check points. *Bulletin 7, 26p.—Hinde*

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For more data, circle this page number on card at back →

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## Hamilton Kettles Choice for New Howard Johnson Commissary . . .

*Fred W. Scott, manager, reports, "We've tried all types . . . and we believe that Hamilton kettles are the finest, most efficient on the market." Recently installed kettles: one 200 gallon style CG Mix Cooker, three 300 gallon style SA kettles.*

The new Howard Johnson Food Commissary, Miami, Florida, selected Hamilton Kettles for fast cooking, sanitary design and stainless steel construction.

Chef O. E. Rathfeldt likes the way Hamilton's extra large kettle diameter gives fast cooking, increases production. He also says streamlined, sanitary design makes equipment easy to clean, saves valuable down time, and the stainless steel construction protects against corrosion, guarantees unusually long kettle life.

More and more food commissaries, meat packers, canners and other members of the food processing industry are turning to Hamilton for fine kettles and prompt service. For information on the complete line of Hamilton Kettles, call Paul Hock, GRandview 1-4110 or write.

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*& Dauch Paper Co., Sandusky, Ohio.* (196HH)

### Taping Machine

Describes conveyor-installed unit for taping cartons. *4p.—Wagner Iron Works, Milwaukee* (199A)

### Plant Weighing System

Folder contains check sheets for surveying your plant weighing system and gaging its over-all efficiency. Bulletins detail fundamentals of efficient weighing and recording, and list various types of scales. *Toledo Scale Co., Ohio.* (199B)

### Rotary Heat Sealers

Concerns operating advantages of rotary, heat-sealing machines for closing cellophane, glassine, and wax-type bags, and coated paper foils and laminates. Optional equipment includes a package dater. *6p.—Doughboy Industries, Inc., New Richmond, Wis.* (199C)

### Automatic Weigher, Filler

Discusses action of a bench-type automatic weighing and filling machine with an agitating top hopper that prevents bridging and clogging of sluggish materials. Speed: 18 to 20 weighs per minute. *1p.—Aidling Inc., Brooklyn, New York.* (199D)

### Cheese Fillers

Pictures show unit and text briefs advantages of a two-line filling machine for processed cheese. Unit handles small and large cheese boxes and cartons. *1p.—Filler Machine Co., Inc., Philadelphia.* (199E)

## PROCESSING

### Sanitary Homogenizers

Color pictures show models of a series of homogenizers, with specifications listed in a separate table. Slots in homogenizing disks permit multi-stream flow. *Bulletin 296, 4p.—American-Marsh Pumps, Battle Creek, Mich.* (199F)

### Colloid Mill

Describes colloid mill construction features that include a removable rotor, stator, and rotary shaft seal. Unit is water-jacketed, and has a rotor speed of 10,000 peripheral ft. per min. Mill applications are covered. *Bulletin C-56, 5p.—Manton-Gaulin Mfg. Co., Inc., Everett, Mass.* (199G)

### Industrial Gloves

Full-color photos cover line of curved-finger rubber, laytex, neoprene, Buna-N, and Compar plastic gloves. Has a chart of finger sizes and a table showing resistance of glove materials to chemicals and solvents. *16p.—Wilson Rubber Co., Canton, Ohio.* (199H)

### Liquid-Handling Equipment

Portrays wide line of concentrating, storing, heat exchanging, and bottling equipment for liquid food products. Numerous food companies cited. *Food, 20p.—Majonnier Bros. Co., 4601 W. Ohio St., Chicago.* (199I)

### Plate-and-Frame Filters

Treats of a vertical, plate-and-frame clarifier for efficient filtering of liquid food products. Plate design, operating procedures, and engineering data are all covered. *Bulletin 20, 4p.—Brosites Products Corp., New York City.* (199J)

### Fats and Oils Processing

Details and illustrates plants and various processing operations for extracting, refining, distilling, deodorizing, fat-splitting, hydrogenation, and fatty acid separation of fats and oils. Schematic drawings are included. *Bulletin 2515, 22p.—Blaw-Knox Co., Pittsburgh, Pa.* (199K)

## INSTRUMENTS

### Snap-Action Thermostats

Tables show electrical ratings, temperature ratings, and modifications of a series of snap-action thermostats. In addition, there are pictures of several snap switches, and also general thermostat information. *Catalog MC-120B, 4p.—Fenwal Inc., Ashland, Mass.* (199L)

### Flow Meters

Describes components and operation for a line of high-capacity flow meters. *Catalog 10-A-43, 4p.—Fischer & Porter, Hatboro, Pa.* (199M)

### Remote Metering System

Describes applications and future expansion provisions of a remote metering system with plug-in construction. System employs transducers and electronic bridge circuit. *2p.—Sparton Control Systems, Jackson, Mich.* (199N)

### Refractive-Index Meter

Treats of electronic unit that continuously indicates and records index of refraction. Contact may be inserted in tanks, pipe, or evaporation chamber. *2p.—Industrial Gauges Corp., West Englewood, N. J.* (199O)


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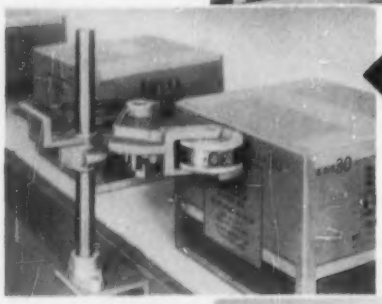
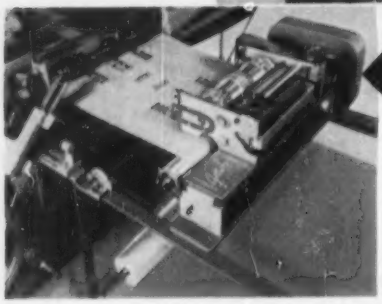


**Side-Coder . . . imprints side surfaces of folding cartons, set-up boxes, rectangular cans and canisters. Can be used to imprint codes, product identification, etc. simultaneously. Fully automatic, adapts to any mechanized production-line.**

**Bottom-Coder . . . portable, space-saving unit that imprints codes on bottom of jars, bottles, cans, etc. Imprint surface may be flat or concave, flush or recessed. Wheels right up to the line, can be moved about at will.**



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### Flow-Rate Regulators

Concerns units for proportionate blending, single-source multiple deliveries, pressure filtration, and other flow rate regulating applications. Complete discussion, data, and breakdown drawings are included. *Form 561, 6p.—W. A. Kates Co., Deerfield, Ill.* (200A)

### Temperature Indicators

Pictures millivoltmeter-type pyrometer indicators, and lists ranges, electrical resistances, and prices. *Bulletin IS25-3, 8p.—Thermo Electric Co., Saddle Brook, N. J.* (200B)

### Fluid-Flow Meters

Gives general information on rotameters and specifies a complete line of meters for regulation of fluid flow. Sizing data, step-by-step instructions, and capacity tables complete the material. *Bulletin 18RG, 12p.—Department M-E, Schutte & Koerting Co., Cornwells Heights, Pa.* (200C)

### Temperature Controllers

Gives specifications on a series of bulb-and-capillary indicating controllers. Building-block units are selected from three temperature ranges, three bulb sizes, single or dual control circuits, and four basic switch types. *Brochure MC-139, 4p.—Fenwal, Inc., Ashland, Mass.* (200D)

### X-Ray Equipment

Treats of X-ray units, closed circuit television, and fluoroscopes. Shows characteristics of instruments, and explains how they are used. Includes three technical data charts. *Bulletin RC-176, 12p.—North American Philips Co. Inc., Mt. Vernon, N. Y.* (200E)

### Flow Transmitters

Diagram units to be used with flowmeters to transmit flow rates to receiving instruments. Pneumatic and electric types are available. *Bulletin 170, 6p.—Brooks Rotameter Co., Lansdale, Pa.* (200F)

### Surface Thermometer

Comprises outline drawing, list of specifications and features, as well as a detailed cross-section of the low-thermal-load surface thermometer. Covers theory of the constantan and stainless steel thermocouple. *Form 2P756, 2p.—Rayco Instruments, Albany, Calif.* (200G)

### Gasket Thermocouples

Details construction of gasket-type thermocouples, used to measure skin temperatures in food processing. Calibration, temperature ranges, and gasket sizes are arranged in chart form. *6p.—Thermo Electric Co. Inc., Saddle Brook, N. J.* (200H)

### Temperature Regulator

Describes self-operating units for temperature regulation that work by liquid expansion, which operates process valves. *Bulletin 500, 4p.—Cash Standard Stacon Corp., Decatur, Ill.* (200I)

### Instrument Catalogs

Lists and classifies wealth of instrumentation literature. Also covers available educational aids and other services. *Bulletin G-2, 20p.—Minneapolis-Honeywell Regulator Co., Philadelphia.* (200J)

### Automatic Controls

Traces growth of analytical instrumentation in process control operations. Discusses good and bad points of various process stream analyzers. Examples of their uses are included. *Bulletin R-88. 8p.—Beckman Instruments Inc., Fullerton, Calif.* (200K)

## QUALITY CONTROL

### Pocket Refractometer

Describes compact refractometer, made in four units, that cover four ranges of sugar concentration. *Bulletin stresses applications. 2p.—Epic, Inc., New York City* (200L)

### Gas Chromatography Units

Catalogs instruments, accessories, adsorbents for performing gas chromatography analysis. *Bulletin 831, 4p.—Burrell Corp., Pittsburgh.* (200M)

### Ovens and Controllers

Describes laboratory ovens and a muffle furnace with their corresponding control systems. *Bulletin 5660, 4p.—Blue M Electric Co., Blue Island, Ill.* (200N)

### Water Still

Step-by-step description is furnished for all components of a water still. Also shows accessories, technical data, and available literature. *Bulletin 910, 6p.—Precision Scientific Co., Chicago.* (200O)

### Plastic Lab-Supplies

Pictures, describes, and prices a complete line of plastic equipment for labs. Furnishes a chemical resistance table, and lists properties of plastics. Beakers, bottles, carboys, funnels, tubing, and valves are included. *Catalog E956, 16p.—Palo Laboratory Supplies Inc., New York City.* (200P)

### Laboratory Instruments

Covers line of lab equipment that includes angle, super-speed, and refrigerated centrifuges, ultramicrotomes, high-speed homogenizers, automatic high-precision conductivity bridge, electrophoresis and chromatography equipment, and gas and moisture testers. *Fall catalog, 8p.—Ivan Sorvall, Inc., Norwalk, Conn.* (200Q)

## Ole Sage: Workers and the Union

—Continued from page 105

who, alone, shoulders the responsibility through this period—the one man in command.

"This man may be your president, or someone the president appoints. But whoever it is you have carrying this load, he should welcome the suggestions of the company's foremen."

"There you go again, Ole," Batt scolded. "Always putting formen in our hair!"

In spite of Batt's interruption, Ole continued unruffled: "Foremen are at the front. They are management's representatives close to the problems—management's ears, management's voice. They're the ones who sense the frictions. They're the ones who are caught in any backwash of crosscurrents.

"However," he accented, "let me make it clear that it is your aforesaid *responsible man* who must make the rules. And these must be adhered to by every member of management.

"And here are some other don'ts," continued Ole: "No foreman should do anything that affects an employee's job or his pay rate. The foreman is in a vulnerable spot. Whatever may be his views, he must maintain a hands-off policy in all dealings with the organizing union's officers. He must never threaten those he believes favor the union, not even through a third person.

"Furthermore," stressed Ole, with a sharp tap of his pipe against his water glass, "it's really vital for the foreman to refrain from any discussion of a union question—and especially to keep himself clear of any argument which might lead to physical encounter.

"For a foreman doesn't have to strike the first blow during this period to seriously involve the company. Bear it in mind that any act of a foreman will be construed as an act by management—and such it is."

**Ole puffed on his pipe a moment** to give Bert a chance to catch up on his notes. Then he began again: "Let's now run down the 'don't discriminate' list. Here, a failure to follow any one will surely result in the charge of 'unfair labor practices'."

"Wait a minute," broke in Ed Strong. "About how many 'don't discriminate' points are there?"

"At least 12 or 14, and maybe more," replied Ole.

"Seems we no more than get started when time runs out," complained Milt. "Anyhow, I'm one who can't stay long enough to run through that many items. Got to get back on the job."

"Me too," added Batt.

"This is unfortunate," lamented Bert. "The time may be very short at my plant—a matter of days. And I need the whole list."

"Here's a suggestion," proposed Si Worth: "Ed Strong and I and several others from Zenith bowl on Wednesday nights. We eat dinner beforehand at the Ram's Head Inn. Let's all meet there next Wednesday eve and get on with the 'don't discriminate' list for Bert—along with all the rest of you who are interested. Afterward, we'll be glad to have any of you join us at the alleys. But, I warn you, some of the boys are pretty hot," he chuckled. "Now, who can come—Bert, Ole, Barney, Mark?"

When most of them said they'd be on hand, Si concluded, "Then it's the Ram's Head at 6:15 Wednesday." *End* *(Resume reading on page 106)*


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520 N. Michigan Ave., Chicago 11, Ill.

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***Is it complete?***

***Are you expanding it?***

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Naturally, you are anxious to secure the most suitable man or men available. You want men with the special training that will make them an asset to your organization. You can contact such men through an advertisement in this Employment Opportunities Section of FOOD ENGINEERING.

*Classified Advertising Division*

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**MECHANICAL ENGINEERS**
**$6000—$8000**

**Several excellent openings with multi-plant company in installation and maintenance of packaging equipment, electro-mechanical instruments, production, project and process; recent grads or experienced. Employer pays our fee and expenses. Send resume and photo to Mr. H. A. Jensen, Dept FE**
**WALKER EMPLOYMENT SERVICE**
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## (PLANT LAYOUT)

**Large, nationally prominent Madison, Wisconsin manufacturer is enlarging its engineering staff to keep pace with an over-all steady and fast moving expansion program. As a result of these stepped-up activities, an excellent opportunity is available for a graduate mechanical engineer, 25 to 35, who has approximately 2 years experience in plant layout.**

**P-3656**—Food Engineering
Classified Adv. Div., P.O. Box 12, NY 36, NY

## *WE NEED*

**FOOD TECHNOLOGISTS and**
**FOOD CANNNING CANDIDATES**
**—junior to top-level**

**Call, write or wire:**
**Gladys Hunting (Consultant)**
**Drake Personnel, Inc.**
**220 S. State St., Chicago 4, Ill.**
**HArrison 7-8600**

**CHEMICAL ENGINEERS**
**$6000—$9000**

**Excellent openings with multi-plant company in paper and plastics packaging, research and development, process and production of refrigerated foods and other food products. Employer pays our fee and expenses. Send resume and photo to Mr. H. A. Jensen, Dept FE**
**WALKER EMPLOYMENT SERVICE**
**212 So. 7th St. Minneapolis 2, Minn.**

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*Send NEW Ads or Inquiries to Classified Adv. Div. of Food Engineering, P. O. Box 12, N. Y. 36, N. Y., for January issue closing December 20th*

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**EXTRA SPECIAL**

**PFAUDLER PISTON FILLER**

- Model R.P. 14
- All Stainless contact
- New 1953
- Excellent Condition.

***MACHINERY AND EQUIPMENT CO.***

514 Bryant Street San Francisco, Calif.

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**HI-PRESSURE**

Complete stock from 10-2,000 h.p.
Nation's largest inventory, New & Used

**WABASH POWER EQUIPMENT**
31 E. CONGRESS, CHICAGO 5, HA 7-4855

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**FOR SALE**

**Food Manufacturing and Direct Mail**

**FOOD BUSINESS**

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National Distribution, also Items for Chains, Jobber, Institutional and Private Label. Tremendous Potential. Owners wish to retire. Price about $50,000. Principals Only.

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*FOR SALE*

**Bucket Elevators, Screw Conveyors, Tyler** Hummer Screen, 1000 #3ph. Trolley Hoist, T. M. N. 67 Van Reipen Ave., Jersey City. JO2-4360.

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***Your inquiry will have Special value . . .***

If you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertisers wants to each with this message . . . and help to make possible enlarged future service to you as a reader.

---

# LOEB OFFERINGS

Cappers Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 20" lith-coated, Tolhurst 26" copper, 26" rubber.
Clarifiers: De Laval model 84-51.
Compressor, Freon: Carrier 25/12½ hp.
Cutter, Bone: Wausau, 5 hp.
Cutters, silent: Buffalo 32" and 43".
Demineralizer: Barnstead 80 GPH.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4' x 20'.
Dryer: Stokes rotary vacuum 2½ x 8'.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers: M & S for cans 6 and 10 pocket, st. st.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: Int. pressure—Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½ x 1'.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 GPH. Gaulin.
Kettle: Dopp 150 gal., jkt., agitated.
Kettles, Stainless steel: 5 to 300 gal., with and without agitators. Aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto and semi-auto.
Mills, hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Colloid: Charlotte st. steel 1 hp., iron 25 hp.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity. Portable Electric: ¼ to 5 hp.
Pasteurizer: Wallace-Walker plate type, 200 GPH, st. steel.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Screens: Rotex 20 x 48", 42 x 84", 18 x 50", Selectro 4 x 10' Abbe Blutergess #1.
Separator: De Laval Nozzle-Matic AC VO.
Sealers, carton: Ceco, Triangle, Packomatic.
Sterlizers: Climax 20" x 36" jacketed.
Still, water: Barnstead 75 gal.
Tablet Presses: Single punch and rotary.
Tanks: Glass lined, various sizes. Stain. steel 25 gal. to 1200 gal. 3—6000 gal. insulated, agitated.

***Send us your inquiries and list of idle equipment***

## LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. Chicago 22, Ill.
Telephone Seeley 8-1431 Our 32nd Year

---

**FOR SALE**

3200 gal. S.S. Truck Tank & Trailer.
Tubular Heat Exchanger, 24- 1"x10' S.S. Tubes.
100 to 400 gal. S.S. Mix Tanks, water jkt.
250 gal. Vert S.S. Tank, insul., agit.
330 gal. S.S. Tank, 45"x48", side agit.
500 gal. S.S. Tank, 50"x54", insul.
500 gal. Pfaudler G.L. Tank, jkt., T.C. Coil.
36" & 60" S.S. Vacuum Pans.
125 to 1500 gal. Homogenizer or Viscolizers.
3000 gal. Horiz. Glass Lined Tanks, agit.
Hope Two Plunger Filler.
50 gal. S.S. Premixer (Tank), side agit.
Little Giant Ice Breaker, 1 H.P.
Baltimore Aircoil Water Cooling Tower, 90 G.P.M.
Hobart Grinder, 1½ H.P.
20, 40 & 125 H.P. Boilers.
Milk Pasteurizers, Coolers, Fillers, Washers.

*Send us your inquiries*

**LESTER KEHOE MACHINERY CORP.**
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

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**FOR SALE FROM STOCK**

- Urschel Model B and Sterling Dicers
- FMC Hand Pack Fillers
- World and Pony semi automatic Labelers
- Burt and Standard Knapp Labelers
- CROO model R-1 Relish Cutter
- Pressure type Retorts, all sizes
- Perforated and slatted Retort Crates
- Boutell Apple Peelers and Slicers
- Bean Soaking Tanks—60" diameter and 60" high
- Karl Kiefer Bottle Rinser
- Elgin, Kramer and Kinex Screw Cappers

*"Write for complete bulletin of used and reconditioned equipment. Mail us a list of your surplus equipment today."*

**Food Processing Equipment Co.**
413 Harrison Court, Kalamazoo, Michigan
Phone: FI-3-2579

---

**DECEMBER SPECIALS**

FMC Hand Packed SS Filler #MH1699
316 SS Single Drum 3' x 5' Dryer, 5 H.P.
MRM 12 opt. SS Straight Line Vac. Filler
Biner Ellison Model 16-G Filamatic
Elgin SS 2 Piston Filler for gallons
Day 40 cu. ft. Mixer with #7 Rotex Sifter
2—125 gal. SS Jacketed Kettles
World Twin Turret Labeler, 120 per minute
Capem 91F Automatic Capper, up to 88mm
3 Pony Labelers, 86MXX, 86ML & 86MX
2 Rotex Sifters 40" x 84" & 40" x 120"
Wrap Around Labelers, All Makes & Sizes

NEW—STEEL & S/S MIXERS, KETTLES, TANKS & DRYERS. Fabricated to Your Specifications. Engineers Advice Available.

*We Buy Complete Plants or Single Units*
*What Have You For Sale?*

YOU CAN BANK ON

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111 33rd Street Brooklyn, N. Y.
SOuth 8-4451—4452—8782

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**FOR SALE**

58" Copper Coating Pans with steam coils
300 gal. Copper Still with condenser and tank
100 qt. 3 speed Read Master Mixer
80 qt. H-80 4-speed Hobart Mixer
100 gal. Copper Steam Jacketed Mixing Kettle
York Freon Compressor with 1½ HP 3 phase motor
Burns Split Nut Peanut Blancher

**SAVAGE BROS. CO.**
2636 Gladys Ave. Chicago 12, Ill.

# FOR SALE

2—Pneu. Scale 6 head capper, 53 mm.
2—Bird 32" x 50" T316 St. St. Continuous Centrifugals.
2—Filler Machine Co., 4 cyl. St. St. piston fillers.
1—Niagara type 316 S. S. Pressure Filter, model 510-28, 500 sq. ft.
10—Shriver & Sperry Filter Presses.
5—Double Drum Dryers: 42" x 100", 32" x 52", 24" x 36".
7—Vacuum Shelf Dryers: 55 to 475 sq. ft.
2—Spray Dryers: Lab, 19'D.
2—Rotary Steam Tube Dryers, 4' x 30'; 6' x 30'.
1—Stokes St. St. 150 gal. Jacketed Vacuum Still.
1—Buflovak #6.5 St. St. Double Effect Evaporator, suitable for Whey.
1—Stokes Type 316 St. St. Double Effect Evaporator, 250 GPH.
1—Conkey Triple Effect Evap. Silicon Bronze, 1900 sq. ft.—UNUSED.
3—Fitzpatrick Comminutors, St. St. models D, F & K.
3—Plaudler Glass lined jacketed Reactors, 300-500 gal.
2—125 gal. St. St. Jacketed Kettles, Scraper Agit.
4—Mikro Pulverizers—#2-DH, #2-TH, #3-TH.
4—Mixers St. St. Double Arm, 5, 50, 75, 200 gal.
2—St. St. Selectro Screens, 2' x 7', two-deck, enclosed.
1—3590 gal. Stainless Steel single axle Truck Tank.
30—Stainless Steel Tanks—30 gal. to 10,000 gal. sizes.
75—Welded Steel Tanks—Brewery lining.

BOTTLING CANNING MACHINERY PERRY SUPPLIES PROCESSING

**PERRY EQUIPMENT CORP.**

1411 N. 6th St., Phila. 22, Pa. Phone: STevenson 4-7210

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**A BRILL BUY**
**. . . IS THE BEST BUY**

## SPECIALS

5—Bird 32"x50" 316 S.S. Solid Bowl, Continuous Centrifuges.
2—Bird 24"x38", 18"x28", 304 S.S. Solid Bowl, Continuous Centrifuges.
2—Bird 40" Suspended Type Centrifugals, 347 S.S.
2—500 gal., 347 S.S. jacketed Autoclaves, 300 psi internal, 75# jacket.
1—Struthers-Wells 375 sq. ft., single effect Evaporator, 316 S.S.
1—Niagara #230-32 Pressure Filter 304 S.S., 250 sq. ft.
2—Sperry 36" Heresite coated F&F Filter Presses.
2—Baker Perkins 100 and 50 gal., 316 S.S. Sigma Blade, jacketed Mixers.
1—I.R. 208 ton Jet Refrigeration Unit.
1—Buflovak 32x120" Double Drum Dryer.
1—Link Belt 5'2" x 20' Steel Roto-Louvre Dryer.
1—Hersey 18"x12' Hot Air Rotary Dryer, 304 S.S.
4—Sweetland Filters #2, #5, #7, #12.
4—Day "Cincinnatus" Sigma Blade Mixers, 200 and 100 gal.
1—#2TH Mikro Pulverizer, 7½ HP motor.

**BRILL EQUIPMENT COMPANY**

2401 Third Ave., New York 51, N. Y.
OR
4101 San Jacinto, Houston 4, Texas

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*SPECIAL OFFERINGS*

## Modern Packaging Equipment

KARL KIEFER 24 Head Fully Automatic, Stainless Steel Vacuum Fillers.

CAPEM 4 and 3 Head Fully Automatic Cappers.

*The above machines are in practically new condition.*

PNEUMATIC SCALE COMPANY Cartoning Line, Consisting of: Automatic Feeder, Bottom Sealer, Filler, Top Sealer & Compression Unit.

PNEUMATIC SCALE COMPANY Tightwraps, High Speed.

PNEUMATIC SCALE COMPANY, WORLD and PONY fully automatic and semi-automatic Labelers, 60-120 per minute.

STOKES & SMITH Model D Neverstop.

STOKES & SMITH Model H.G. 84, G, and GD Auger Fillers.

STOKESWRAP Model A with electric eye, counter, stainless steel auger filler.

PACKAGE MACHINERY CO Model FA & FA2 Wrappers.

*Partial List— send for complete list of equipment in stock.*

## JUST RECEIVED

**Pneumatic Scale Company**
**120 Per Minute Bottling Line**
consisting of Bottle Cleaner, Stainless Steel Filler, 4 Head Rotary Capper and Duplex Labeler. Above unit Five years old.

**ALLIED EQUIPMENT CO.**
940-946 Nepperhan Ave., Yonkers 3, N. Y.
Phone: Yonkers 5-0442

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## STAINLESS STEEL DRYER

1—Rotary Dryer, Stainless Steel, 30"x18'—with lifting flights and motor drive.

THE MACHINERY & EQUIPMENT CORP.
293 Frelinghuysen Ave., Newark 12, N. J.
*TAlbot 4-2050*

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U.S. Bottlers #16-507 Rotary stainless steel vacuum Filler.
Resina Model S-305, 28/mm automatic capper.
New Jersey Champion #160-215400 Thermo-Plastic Labeler.

ACE PROCESSING EQUIPMENT CO.
6825 S. Kenwood Ave. Chicago 37, Ill.

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Rebuilt Machinery

Established 1912

## LATE TYPE REBUILT MACHINERY

### At Bargain Prices

**MIXERS**

Baker Perkins 16-RNM2 150 gal. Steam Jacketed Mixers, Vacuum Dome, Cored Jacketed Sigma Blades.
Baker Perkins 50 gallon Stainless Steel Steam Jacketed Double Arm Mixers.
Day 12, 20, 30, 75, 100, 150 gal. Double Arm Mixers, Cincinnatus and Imperial.
J. H. Day 50 to 10,000 lb. Steel, Wood and Enamel Powder Mixers.
Gemco 30 cu. ft. Vacuum Double Cone Blender.
3500 gallon working capacity Steam Jacketed Double Arm Mixing Tanks for mixing, storing or processing of your materials.

**FILLERS & CAPPERS**

Triangle Package Models U1, A3, A1C, G2C, A6CA Elec-Tri-Pak Fillers.
S. & S. G1, G2, G6, HG88 Auger Fillers.
Filler, Hope, Elgin S. S. Piston Fillers.
Elgin 24-Head Rotary Vacuum Filler.
Resina LC Automatic Capper.
Capem 1 Head and 4 Head Cappers.

**WRAPPERS**

Hayssen, Package Machy. Co. FA, FA4, DF, CA2, Miller, Scandia and Oliver Automatic Cellophane Wrappers.
Hudson Sharp Campbell Automatic Wrappers, Models 2W6, 2W8, and 2W10.
Forgrove Model 26D Foil Wrapper with underneath fold and adjustable jaws.
Transwrap Model B Auger Filler.
Standard-Knapp No. 429 Carton Sealer.
Doughboy and Pack Rite Automatic Rotary Bag Sealers.

**LABELERS**

Burt and Knapp Adjustable Wraparound Labelers.
Pony M, and ML and TO (Thermoplastic) Labelrites.

**MISCELLANEOUS**

Sanders 20HP Meat or Fruit Grinder.
Brown PFM Automatic Bag Filling Machine.
Fitzpatrick "D" S. S. Comminuter.
Mikro 4TH, 3TH, 3W, 2TH, 1SH Pulverizers.
Charlotte 3 HP Colloid Mill.
Stokes D, DD2 and RBB Tablet Machines.
Colton 2RP, 3RP Rotary Tablet Machines.

**PROMPT DELIVERIES**

*Write, Wire, Phone For Details and Prices*
*Act Now For Choice Selection*

**TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT**

## UNION STANDARD EQUIPMENT CO.

**318-322 Lafayette Street**
**New York 12, New York**
***Phone: Canal 6-5334***



FMC

### Choice Equipment for the Food Industries . . in Stock for Immediate Shipment

NEW FALCON Ribbon Blenders or Mixers in Mild or Stainless Steel; all sizes
NEW Stainless Steel Steam Jacketed Kettles and Tanks; all sizes
Special Lot of Stainless Clad Kettles; Steam Jacketed; 80 gal. capacity
Copper Kettles up to 250 Gal.; Glass Lined to 300 Gal.; Aluminum to 80 Gal.
VACUUM PANS: Pfaudler Glass Lined, 500 and 1000 Gal.; Aluminum or Copper 250 Gal.
Sterilizers: 48"x42"x96"; 36"x42"x84"; Ft. Wayne 61"x126"; others
Double Drum Dryers: 32"x72"; 42"x100"; Twin Dryers 42"x120"
Buffalo Chrome Plated Flaker: 12"x18" complete with accessories
Food Machinery Corp. Retorts: Standard 42"x72" Vertical
Devine No. 23 Double Door Vacuum Shelf Dryer: 57"x78" shelves; complete
Stokes No. 138B Vavuum Shelf Dryer: Shelves are 24"x24"; complete
Anderson Oil Expeller Model "Red Lion" with 15 HP. motor and accessories
Anderson Oil Expeller Type "RB" with 25 HP motor and accessories
American Utensil (CRCO) Model "B" Juice Extractor with 5 HP Motor
Manton Gaulin Stainless Steel Homogenizer Type 125 CGC
A. T. Case Stainless Steel S 50 Homogenizer with 15 HP Motor
Charlotte Model 50 Colloid Mill in Monel
DICERS by Sterling and Anderson; Rotary Cutters by Abbe, Ball & Jewell, Munson
Sterling and Blakeslee Potato Peelers: Various sizes; Coffee & Meat Grinders
Robinson and Bauer Double Runner Attrition Mills: 24" and 18" with 2 Motors
Hammer Mills, Grinders, Crushers by Williams, Gruendler, Jay Bee, Mikro etc.
Sprout Waldron 2 Pair High Roller Mill: 9"x18"; Robinson Unique 4 Roll 7"x24"
SIFTERS: Witte, S.S. 21"x101"; Rotex 30"x60"; Patterson Gyro 3 Deck 20"x84"
Robinson Unique S.S. 20"x70"; Ajax Vibratory in S.S. 18"x48"
Robinson Gyro Double Deck 20"x90"; Selectro 18"x48" & 24"x84"
J. H. Day Egg Clipper Mixers: 20"x22"x28 and 32"x32"x25"
Savage Marshmallow Beater: 200 lb. Capacity; arranged for M.D.
FILLERS: Stokes & Smith Powder Fillers, Semi and Automatic Models
Triangle Electri-Pak 4 Station Conveyor Type Filler
Gump Bar-Num Vibrox Barrel Packers
Berlin Chapman Syruoer Type Liquid Filler up to 6o 3 Cans
Berlin Chapman Stainless Steeel 7 Spout Filler up to No. 10's
Horix Stainless Steel 14 Stem Gravity-Vacuum Fillers up to qts.
Karl Kiefer 2 Stream Vari Visco Filler for Liquids and Semi-Liquids
Karl Kiefer Rotary Vacuum Fillers with 12, 16 and 18 Stations
LABELERS: Can Labelers by Standard Knapp, Burt, Kyler, Nu-Method and others
Bottle Labelers by New Jersey, World, Ermold, Pneumatic Scale, others.
Piston Fillers from 1 to 11 Pistons, by Elgin Filler M Co., Bridge, etc.
M. & S. Stainless Steel 10 Pocket Hi Speed Fillers for small cans
CAPPERS: Pneumatic Scale 4 Head Automatic Capper; Capem 4 Head Model B2F
Johnson Automatic Wrapper for Frozen Food Packages; adjustable within limits
Standard Knapp Automatic Gluer & Sealer No. 429-600 Series complete
SPECIAL AGITATORS at less than Half Price: Top Entering 5 HP S.S. 240 RPM

**The above list represents only the more important units; if you do not see listed the item you need, do not hesitate to send us your inquiry.**

***SEND US YOUR LIST OF SURPLUS EQUIPMENT***

## FIRST MACHINERY CORP.

**209-289 TENTH STREET, BROOKLYN 15, N. Y.**
**PARKING ON THE PREMISES**
**PHONE: STerling 8-4672**

FRED FIRSTENBERG, *President*

Cable "EFFEMCY"



# BARGAINS FOR SALE

The RUDERMAN MACHINERY EXCHANGE of Gouverneur, N. Y., one of the largest diversified Machinery & Equipment Dealers in America, can furnish you with practically all your needs in Modern Ice Cream, Milk Plant and Electrical Equipment at but a fraction of the original cost.

*Among the hundreds of items in stock are included the following:*

**Storage and Holding Tanks of all sizes**
**Filters**
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**Pasteurizers**
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**Slicers and Slicing Machinery**
**Fruit Strainers**
**Kettles**
**Whippers**
**Nut Choppers and Grinders**
**Molds**
**Variegators**
**Baggers and Bagging Machines**
**Bottle Washers**
**Cup Dispensers and Cappers**
**Wire Baskets**
**EDM Equipment**
**Scales**
**Slab Fillers**
**Thermometers and Recorders**
**S.S. Tables**
**S.S. Pumps of all types**
**S.S. Pipe and Fittings**
**Electric Motors and Gear Reducers of all sizes**

The above is but a small part of the inventory we carry. This machinery is all of modern type, mostly stainless steel.

WRITE — WIRE — PHONE FOR YOUR NEEDS

## RUDERMAN MACHINERY EXCHANGE

**GOUVERNEUR, NEW YORK** **Telephone: 333-334**

## ADVERTISERS IN THIS ISSUE


Abbott Laboratories .....35-42
Allied Chemical & Dye Corporation
National Aniline Division..... 181
Allis-Chalmers Mfg. Co..... 197
Aluminum Company of America..... 167
American Molasses Company
The Nulomoline Division..... 153
American Optical Company.....183, 191
Ampco Metal, Inc..... 168
Atlas Powder Company.....46-47
Aurora Pump Division
The New York Air Brake Company.BL201

Bakelite Company
Union Carbide & Carbon Corp....48, 135
Barnes Company, The W. F. & John.. 27
Brunner Manufacturing Company..... 4
Buffalo Forge Company..... 17

Canning Machinery Division
Food Machinery & Chemical Corp... 8
Carbide & Carbon Chemicals Company
Union Carbide & Carbon Corporation 154
Carpenter Steel Company, The
Alloy Tube Division..... 182
Carrier Corporation .....Flowsheet 114
Cherry-Burrell Corporation..... 124
Clark Door Company, Inc.....BR201
Colorado Fuel And Iron Corporation... 120
Consolidated Packaging
Machinery Corporation .....TL180
Copeland Refrigeration Corporation... 170
Corn Products Refining Co.....28-29
Crane Co. .....Flowsheet 113
Crown Cork & Seal Company, Inc..136-137
Crucible Steel Company of America... 118
Cyclone Fence Dept. Division of
United States Steel Corporation..TR179

Darnell Corporation, Ltd. ..... 134
Day Company, The J. H. ..... 166
Deming Company, The..... 129
Distillation Products Industries
Eastman Kodak Company..... 199
Dow Chemical Company, The..... 21
Dow Corning Corporation..... 169

Firmenich Incorporated ..... 165
Food Machinery & Chemical Corp.
Canning Machinery Division..... 8
Frick Co. .....BL178
Fritzsche Brothers, Inc..... 94
Fuller Company, The
Pull-out Flowsheet 112

Gardner-Denver Company..... 43
Garland Company, The..... 185
Gates Rubber Company, The..... 122
Gaylord Container Corporation, Div. of
Crown Zellerbach Corp.....Third Cover
General American Transportation Corp.
Airslide Cars ..... 45
Louisville Dryer ..... 6
General Mills, Inc. ..... 85
Gentry Inc. ..... 140
Girdler Company, The ..... 159
Goodrich Company, The B. F.
B. F. Goodrich Industrial
Products Company ..... 31
Gottsche, Inc., Adolph..... 200
Great Lakes Carbon Corporation
Dicalite Division ..... 18
Great Western Sugar Company, The... 190
Greer Company, J. W.....19, 90
Grinnell Company, Inc Second Cover

Hamilton Copper & Brass Works
Division of Brighton Copper Works.. 198
Hinde & Dauch..... 141
Hoffmann-La Roche, Inc.....50, 147-148

International Salt Co., Inc..... 155

Jenkins Bros. ..... 127
Johns-Manville
Refrigeration Insulation ..... 20

King Co. of Owatonna, The.....TL192

Ladish Co., Tri-Clover Division..... 16
La Porte Mat & Mfg. Co.....BL176
Lee Metal Products Co., Inc..... 145
Link-Belt Company ..... 25

Master Electric Company, The..... 162
Mathews Conveyor Company..... 142
Merck & Co., Inc. ..... 44
Minneapolis-Honeywell Regulator Co.
Industrial Division .....22-23
Mixing Equipment Co., Inc..Flowsheet 107
Monsanto Chemical Company
Plastics Division ..... 144

Nash Engineering Company..... 103
National Aniline Division
Allied Chemical & Dye Corporation.. 181
National Starch Products Inc..... 26
Niagara Blower Company ..... 146
Nicholson & Co., W. H..... 49
Norda, Inc. ..... 150
Nutritional Research Associates..... 203
Nutting Truck & Caster Co.....BR188

Oakite Products, Inc. ..... 156

Partlow Corporation, The..... 152
Pfaudler Co., The..... 82
Pfizer & Co., Inc., Chas.....14-15, 174
Philadelphia Quartz Company.....BR179
Pitney-Bowes, Inc. ..... 209
Pittsburgh Corning Corporation..... 104
Powell Valves ..... 24

Quaker City Cold Storage Co., Inc.... 203

Refined Syrups & Sugars, Inc..... 184
Reliance Electric & Engineering Co.... 30
Reeves Pulley Company..... 157
Riegel Paper Corporation..... 139
Robbins & Myers, Inc..... 10
Robins & Company, Inc., A. K..... 143
Ryerson & Son, Inc., J. T.....BL180

Sandvik Steel, Inc..... 126
Sarco Co., Inc. ..... 89
Schroeder Machines Corporation..... 187
Schutz-O'Neill Company..... 133
Sharples Corporation, The..... 100
Shell Chemical Corporation..... 177
Sigmamotor, Inc. .....TL186
Sparta Brush Co. Inc.....BL186
Sperry & Co., D. R. .....BL192
Spray Engineering Co .....BL188
Standard Oil Company (Indiana)..... 123
Standard Steel Corporation.....TR173
Sterling Electric Motors..... 132
Sterwin Chemicals Inc.
Vitamins Division ..... 128
Strahman Valves, Inc..... 193
Sunkist Growers ..... 194

Takamine Laboratory, The
Div. of Miles Laboratories, Inc..... 158
Toledo Scale Company..... 149
Ton-Tex Corporation .....BR173

Ungerer & Co. ..... 210
Union Carbide & Carbon Corporation
Bakelite Company .....48, 135
Carbide & Carbon Chemicals Co..... 154
United Cork Companies..... 161
United States Rubber Company
Mechanical Goods Division..... 131
United States Steel Corporation
Cyclone Fence Department.....TR179

Van Ameringen-Haebler, Inc..Fourth Cover
Victor Balata & Textile Belting Co.... 160
Vilter Manufacturing Company, The.. 125

Wallingford Steel Co., The..... 130
Walworth Company ..... 12
Washington Steel Corporation..... 97
West Bend Equipment Corp.....BL180
Western Precipitation Corporation.... 34
Wickwire Spencer Steel Div. of CF&I.. 120
Worthington Corporation
Air Conditioning & Refrig. Div..... 32

Yarnall-Waring Company ..... 33

PROFESSIONAL SERVICES ..... 203

CLASSIFIED ADVERTISING
F. J. Eberle, Business Mgr.

EMPLOYMENT OPPORTUNITIES... 204

BUSINESS OPPORTUNITIES..... 205

EQUIPMENT
(Used or Surplus New)
For Sale .....205-207


### SALES REPRESENTATIVES

ATLANTA 3.....Robert H. Powell, Jr.
801 Rhodes-Haverty Bldg...Walnut 5778
BOSTON 16.....Paul T. Fegley
350 Park Square Bldg....Hubbard 2-7160
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LONDON E. C. 4, ENGLAND.....H. Lagler
85 Farringdon Street
PARIS 6, FRANCE.....S.P.I.C.
3, Avenue George V.....Dept. Etranger


ADVERTISERS INDEX

Ace Processing Equipment Co..... 206
Allied Equipment Co..... 206
Brill Equipment Co..... 206
Drake Personnel Inc..... 204
Equipment Clearing House Inc..... 205
First Machinery Corp..... 207
Food Processing Equipment Co..... 205
Kehoe Machinery Corp., Lester..... 205
Kroger Co., The..... 204
Loeb Equipment Supply Co..... 205
Machinery & Equipment Co., Inc., (Calif.) ..... 205
Machinery & Equipment Corp. N. J.... 206
Monsanto Chemical Co..... 204
Perry Equipment Corp..... 206
Ruderman Machinery Exchange..... 207
Savage Brothers Co..... 205
Union Standard Equipment Co..... 207
Wabash Power Equipment Co..... 205
Walker Employment Service..... 204

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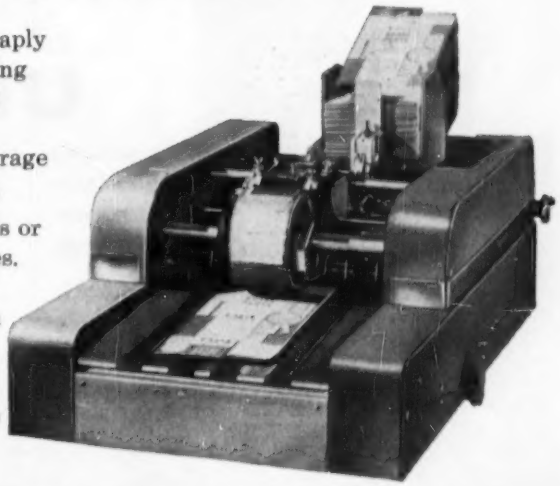

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- 17b Bul. FD-205
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- 17d Bul. 3720
- 17e Bul. 3576

44 All items shown
- 44a Vitamin A
- 44b Vitamin products
- 44c Ascorbic acid
- 44d Calcium cyclamate

46-7 All items shown
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- 46-7b Atmul
- 46-7c Atmos

107 All items shown
- 107a Bul. B-102
- 107b Bul. B-103
- 107c Bul. B-108
- 107d Bul. B-104
- 107e Bul. B-112
- 107f Bul. B-09
- 107g Bul. B-111
- 107h Bul. B-107

128—All items shown
- 128a Vitamins
- 128b Food colors
- 128c Vanillin
- 128d Sanitizing agents

145 All items shown
- 145a Kettles
- 145b Pressure kettle
- 145c Vacuum pan
- 145d Cooling pan
- 145e Scraper-agitators

160a Victor suprene

160b Victor 475

173a Hersey dryers

173b Pur-O-Tex

179a Belt bklt.

179b Metso detergents

180a Sealtite

180b Steel

180c Conveyor

183a Comb. hand & dip refractometer

183b Process refractometer

185 All items shown
- 185a Super-hesive roof-ings
- 185b Supernamel
- 185c Acanal
- 185d Chemi-top com-pound

186a Pump cat.

186b Brushes

188a Nozzles

188b Cat. 56G

188c Bul. 48JS

188d Bul. 54DJ

188e Bklt. 53SR

188f Bul. 53SC

188g Bul. 54TL

191a Process refractometer

191b Comb. hand & dip refractometer

192a Tech. buls.

192b Tell-all cat.

194 All items shown
- 194a Orange oils
- 194b Lemon oils
- 194c Preservers' pectin
- 194d Low methoxyl pectin
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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 21 | 44c | 107 | 125 | 141 | 156 | 176 | 185d | 194 |
| 4 | 22-3 | 44d | 107a | 126 | 142 | 157 | 177 | 185e | 194a |
| 6 | 24 | 45 | 107b | 128 | 143 | 158 | 178 | 186b | 194b |
| 8 | 25 | 46-7 | 107c | 128a | 144 | 159 | 179a | 187 | 194c |
| 10 | 26 | 46-7a | 107d | 128b | 145 | 160a | 179b | 188a | 194d |
| 12 | 27 | 46-7b | 107e | 128c | 145a | 160b | 180a | 188b | 194e |
| 14-5 | 28-9 | 46-7c | 107f | 128d | 145b | 161 | 180b | 188c | 197 |
| 16 | 30 | 48 | 107g | 129 | 145c | 162 | 180c | 188d | 198 |
| 17 | 31 | 49 | 107h | 130 | 145d | 165 | 181 | 188e | 199 |
| 17a | 32 | 82 | 112 | 131 | 145e | 166 | 182 | 188f | 200 |
| 17b | 33 | 85 | 113 | 132 | 146 | 167 | 183a | 188g | 201a |
| 17c | 34 | 89 | 114 | 133 | 149 | 168 | 183b | 190 | 201b |
| 17d | 35-42 | 90 | 118 | 134 | 150 | 169 | 184 | 191a | 209a |
| 17e | 43 | 94 | 120 | 135 | 152 | 170 | 185 | 191b | 209b |
| 18 | 44 | 97 | 122 | 137 | 153 | 173a | 185a | 192a | 210 |
| 19 | 44a | 100 | 123 | 138 | 154 | 173b | 185b | 192b | 211 |
| 20 | 44b | 104 | 124 | 140 | 155 | 174 | 185c | 193 | 212 |

EDITORIAL

These numbers correspond to numbers in text

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 62A | 65E | 68G | 88O | 119C | 138B | 195O | 196Q | 196AA | 199M |
| 62B | 66A | 68H | 88E | 121A | 140A | 195P | 196H | 196BB | 199N |
| 62C | 66B | 68I | 88F | 121B | 140B | 195Q | 196I | 196CC | 199O |
| 62D | 66C | 69A | 91A | 121C | 140C | 195R | 196J | 196DD | 200A |
| 62E | 66D | 69B | 91B | 122A | 142A | 195S | 196K | 196EE | 200B |
| 63A | 66E | 69C | 91C | 125A | 145A | 195T | 196L | 196FF | 200C |
| 63B | 66F | 69D | 91D | 126A | 195A | 195U | 196M | 196GG | 200D |
| 63C | 67A | 69E | 91E | 126B | 195B | 195V | 196N | 196HH | 200E |
| 63D | 67B | 86A | 91F | 129A | 195C | 195W | 196O | 199A | 200F |
| 63E | 67C | 86B | 91G | 129B | 195D | 195X | 196P | 199B | 200G |
| 63F | 67D | 86C | 115A | 130A | 195E | 195Y | 196Q | 199C | 200H |
| 64A | 67E | 86D | 115B | 130B | 195F | 195Z | 196R | 199D | 200I |
| 64B | 67F | 87A | 116A | 130C | 195G | 195AA | 196S | 199E | 200J |
| 64C | 67G | 87B | 116B | 130D | 195H | 195BB | 196T | 199F | 200K |
| 64D | 67H | 87C | 116C | 130E | 195I | 196A | 196U | 199G | 200L |
| 64E | 68A | 87D | 116D | 130F | 195J | 196B | 196V | 199H | 200M |
| 64F | 68B | 87E | 117A | 130G | 195K | 196C | 196W | 199I | 200N |
| 65A | 68C | 87F | 117B | 130H | 195L | 196D | 196X | 199J | 200O |
| 65B | 68D | 88A | 117C | 132A | 195M | 196E | 196Y | 199K | 200P |
| 65C | 68E | 88B | 119A | 132B | 195N | 196F | 196Z | 199L | 200Q |
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| 14-5 | 28-9 | 46-7c | 107f | 128d | 145b | 161 | 180b | 188c | 197 |
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| 17 | 31 | 49 | 107h | 130 | 145d | 165 | 181 | 188e | 199 |
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| 17b | 33 | 85 | 113 | 132 | 146 | 167 | 183a | 188g | 201a |
| 17c | 34 | 89 | 114 | 133 | 149 | 168 | 183b | 190 | 201b |
| 17d | 35-42 | 90 | 118 | 134 | 150 | 169 | 184 | 191a | 209a |
| 17e | 43 | 94 | 120 | 135 | 152 | 170 | 185 | 191b | 209b |
| 18 | 44 | 97 | 122 | 137 | 153 | 173a | 185a | 192a | 210 |
| 19 | 44a | 100 | 123 | 138 | 154 | 173b | 185b | 192b | 211 |
| 20 | 44b | 104 | 124 | 140 | 155 | 174 | 185c | 193 | 212 |

EDITORIAL

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|---|---|---|---|---|---|---|---|---|---|
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| 62C | 66B | 68I | 88F | 121B | 140B | 195Q | 196I | 196CC | 199O |
| 62D | 66C | 69A | 91A | 121C | 140C | 195R | 196J | 196DD | 200A |
| 62E | 66D | 69B | 91B | 122A | 142A | 195S | 196K | 196EE | 200B |
| 63A | 66E | 69C | 91C | 125A | 145A | 195T | 196L | 196FF | 200C |
| 63B | 66F | 69D | 91D | 126A | 195A | 195U | 196M | 196GG | 200D |
| 63C | 67A | 69E | 91E | 126B | 195B | 195V | 196N | 196HH | 200E |
| 63D | 67B | 86A | 91F | 129A | 195C | 195W | 196O | 199A | 200F |
| 63E | 67C | 86B | 91G | 129B | 195D | 195X | 196P | 199B | 200G |
| 63F | 67D | 86C | 115A | 130A | 195E | 195Y | 196Q | 199C | 200H |
| 64A | 67E | 86D | 115B | 130B | 195F | 195Z | 196R | 199D | 200I |
| 64B | 67F | 87A | 116A | 130C | 195G | 195AA | 196S | 199E | 200J |
| 64C | 67G | 87B | 116B | 130D | 195H | 195BB | 196T | 199F | 200K |
| 64D | 67H | 87C | 116C | 130E | 195I | 196A | 196U | 199G | 200L |
| 64E | 68A | 87D | 116D | 130F | 195J | 196B | 196V | 199H | 200M |
| 64F | 68B | 87E | 117A | 130G | 195K | 196C | 196W | 199I | 200N |
| 65A | 68C | 87F | 117B | 130H | 195L | 196D | 196X | 199J | 200O |
| 65B | 68D | 88A | 117C | 132A | 195M | 196E | 196Y | 199K | 200P |
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MAIL CARDS FOR MORE INFORMATION

## Equipment & Supplies Literature Offered:


Air-cond. equip. ... 155, 195
Pans ... 17, 195
Antibiotics ... 14-5
Brine equip. ... 155
Boxes ... 141, 196, 211
Chemicals ... 196
Compressors ... 43, 91, 103
Hermetic ... 196
Containers
Boxes ... 141, 196, 211
Plastic ... 138
Controls ... 22-3, 119, 195
Batching ... 121
Detectors ... 121
Filling ... 67
Flow ... 63, 199, 200
Recording ... 199
Refractometers ... 183, 191
Temperature ... 80, 152
Water still ... 200
Weight ... 63, 140, 199
X-Ray ... 200
Conveyor equip. ... 116, 142
Belts ... 31, 63, 120, 126
131, 160, 173, 176, 179
Chains ... 196
Loaders ... 87
Pneumatic ... 112
Screw ... 95
Slider bed ... 121
Stackers ... 117
Vertical ... 180
Directory, steel container ... 196
Doors, cold storage ... 201
Electrical equip.
Aluminum conduit ... 107
Fans ... 17, 195
Generators ... 195
Heaters ... 196
Lighting units ... 195
Lights ... 130
Gloves, protective ... 199
Insulation
Cork ... 161
Covers, plastic ... 117
Glass foam ... 104
Refrigeration ... 99
Laboratory equip. ... 196, 200
Lubrication ... 125
Equipment ... 130
Lubricants ... 123, 198
Materials handling ... 62
Lifts, portable ... 196
Pallets ... 196
Racks, storage ... 117, 196
Tractors ... 132, 196
Trucks, industrial ... 183
Metals
Screw products ... 196
Steel ... 97, 118, 180
Motors ... 132, 157, 195
Gearmotors ... 30
Nozzles, spray ... 188
Packaging equip. ... 67, 137
145, 180, 187
Banders ... 67
Cappers ... 67, 68
Cartoners ... 86, 87
Closers, can ... 86
Coders ... 68, 122, 200
Fillers ... 27, 66, 67, 82
199
Imprinters ... 200
Labelers ... 200
Markers ... 87
Sealers ... 87, 196, 199
Stackers ... 64
Stitchers, carton ... 87
Unscrambler ... 86
Unscrew ... 64
Wrappers ... 68, 196
Packaging materials ... 137
140
Bottle spray ... 196
Boxes ... 141, 196, 211
Caps ... 142
Containers, plastic ... 138
Impregnated ... 177
Jars ... 140
Paper ... 199
Plastic ... 48, 135, 144
Spray ... 69
Tape ... 140
Pipe & Tubing ... 182, 195
Fittings ... 16, 195
Hose ... 196
Hose stations ... 193
Stainless steel ... 130
Plant equip. ... 69
Plastics ... 195
Process equip. ... 19, 31, 120
130, 143, 145, 199
Blenders ... 121
Castings ... 195
Dryers ... 6, 130, 173
Heat exchangers ... 196
Homogenizers ... 69, 199
Kettles ... 198
Mixers ... 107, 166
Peelers ... 8
Pulverizers ... 123
Tanks ... 124
Pumps ... 10, 112, 159, 186
195, 201
Centrifugal ... 168
Interchangeable ... 195
Pneumatic control ... 91
Proportioning ... 195
Turbine ... 129
Refrigeration ... 4, 32, 63, 64
114, 125, 170, 178
192, 195
Blowers ... 146
Doors ... 201
Freezers ... 90
Insulation ... 26
Refrigerants ... 91
Trucks ... 132
R.R. cars ... 45
Salt ... 155
Sanitation ... 69, 128
Brushes ... 186
Clarifiers ... 91, 100
Cleaners ... 65, 88, 91
Cleaners, brush ... 88
Cleaners, rust ... 86
Detergents ... 88
Detergent gun ... 156
Sterilizers, air ... 88
Water, conditioner ... 126
Screens
Stainless steel ... 196
Wire ... 195
Separation equip. ... 17, 180
115
Deodorizers ... 62, 63
Filters ... 88, 91, 130
192, 199
Filtersalds ... 18
Magnetic ... 195
Strainers ... 33
Tile, mosaic ... 195
Transmission equip. ... 116
122, 130
Bearings ... 196
Drives ... 116, 162, 195
Pulleys ... 195
V-belts ... 116, 196
Trays, steam ... 49, 113
195
Trucks
Commercial ... 130
Industrial ... 188, 196
Refrigeration ... 132
Valves ... 16, 24, 127, 195
196
Control ... 195
Diaphragm ... 2
Wedge gate ... 12
Water, softeners ... 195
Wheels & Casters ... 134, 188
196


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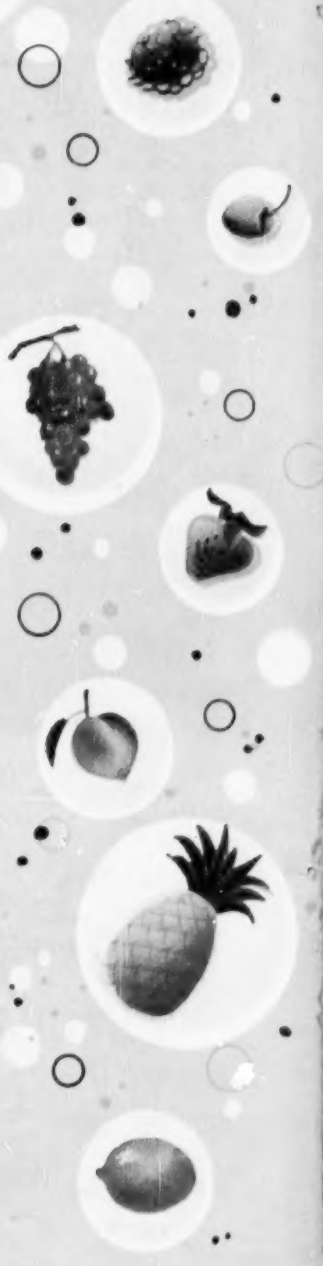

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